



FRIDAY, MAY 21, 1880.

Master Mechanics' Association—Committee Reports.

The following are some of the committee reports presented at the Cleveland Convention.

REPORT OF COMMITTEE ON PERFORMANCE OF LOCOMOTIVES.

To the American Railway Master Mechanics' Association:

GENTLEMEN: Your committee, appointed at the last annual convention to report on the subject of comparative performance of locomotives, with regard to economy in their operation, would respectfully report that they issued the following circular:

"The undersigned, a committee appointed at the last annual convention of the American Railway Master Mechanics' Association, to report on the subject of comparative performance of locomotives with regard to economy in their operation, respectfully solicit any information you may have bearing on this subject.

Engines.	Size cylinder and stroke.	No. driving wheels.	Diameter of driving wheels.	Weight on drivers.	Total weight on wheels.	Kind of fuel.	Average grade.	Total cost per mile run.	Average cost per car per mile hauled.	Remarks.
Eight-wheel.										
Ten-wheel.										
Mogul.										
Consolidation.										

"A blank form is here appended for convenience in giving dimension and data of the four classes of locomotives named in form, as the tendency is toward using a heavier class of locomotives in freight service. The committee desires to get all the data it can, in order to make comparison. Please state which class of engine, in your judgment and experience, is best adapted for heavy freight service, all things being considered."

In reply to the above circular, your committee received eight replies, all of which furnish very little data from which to make up a report such as we would desire to present to the association. Most of the replies are from members having in use the American or eight-wheeled engine.

Mr. N. E. Chapman, Master Mechanic of the Cleveland & Pittsburgh Railroad, says the engines on his road are nearly all of the eight-wheel pattern, having but five ten-wheel engines, which are not doing regular road service, from which to make comparisons.

He states that there is no doubt in his mind but that the mogul and consolidation class of engines are the best for freight service when the speed does not exceed twelve miles an hour. For a higher rate of speed, the eight-wheel engine would be more economical.

G. A. Coolidge, Superintendent Machinery and Motive-Power of the Fitchburg Railroad, says that for heavy freight service on steep grades he considers the consolidation class of locomotives the best, and for general freight service on undulating roads, with moderate grades, he prefers the mogul class to the American or eight-wheel engine. They have in use on this road four consolidation and fifteen mogul engines. No data received of work performed or cost of doing the same. Form enclosed as follows:

Engines.	Size cylinder and stroke.	No. driving wheels.	Diameter of driving wheels.	Weight on drivers.	Total weight on wheels.	Kind of fuel.	Average grade.	Total cost per mile run.	Average cost per car per mile hauled.	Remarks.
8-wheel.	15x16 in.	4	4 1/2 ft.	30,000	62,000	Bit'm coal.				
10-wheel.	17x24 in.	6	4 3/4 ft.	60,000	72,000	"				
Mogul.	17x24 in.	6	4 3/4 ft.	60,000	72,000	"				
Consolidation.	20x24 in.	8	4 ft.	87,000	100,000	"				

Mr. James Sedgley, General Master Mechanic of the Lake Shore & Michigan Southern Railroad, in his reply inclosed a printed statement giving the performance of seven mogul and seven American or eight-wheel engines, with reference to economy in fuel consumed. The result shows a difference of 2 1/2 per cent. in favor of the mogul engine. Form inclosed, giving data, etc.

PERFORMANCE OF SEVEN BALDWIN MOGUL ENGINES.  
Cylinder 16x24 in., driving wheels, 4 ft. 6 in. diameter.  
Year 1878.

No. of engine.	Miles run.	FUEL CONSUMED.		Miles run to one ton of coal.	Cars hauled one mile.	Pounds of fuel per car per mile.
		Tons coal.	C'ds wood kindling.			
479...	33,408	1,191	407 1/2	26.06	1,391,824	
483...	32,053	1,107	454 1/2	28.60	1,454,803	
485...	33,886	1,145	463 1/2	28.45	1,351,333	
486...	34,044	1,219	468 1/2	26.91	1,408,255	
488...	30,823	1,131	438 1/2	26.16	1,285,486	
489...	30,241	1,087	423 1/2	27.67	1,328,382	
490...	32,702	1,093	455 1/2	28.76	1,350,366	
	228,057	7,978	315 1/2	27.49	9,508,449	1.73

PERFORMANCES OF SEVEN EIGHT-WHEEL ENGINES.  
Standard wheels 5 ft. Cylinders, 17x24 in.

No. of engine.	Miles run.	Tons coal.	C'ds wood kindling.	Miles run to one ton of coal.	Cars hauled one mile.	Pounds of fuel per car per mile.
307...	31,209	1,035	428 1/2	28.07	1,302,087	
308...	32,700	1,230	454 1/2	25.72	1,317,479	
370...	33,307	1,177	458 1/2	27.30	1,416,577	
372...	30,898	1,086	438 1/2	27.36	1,261,484	
375...	33,857	1,132	47	29.77	1,303,610	
376...	29,097	1,030	414 1/2	28.00	1,278,855	
377...	28,973	1,080	398 1/2	25.83	1,154,292	
	221,100	7,776	304 1/2	27.36	9,124,384	1.77

One cord kindlings rated one ton of coal. Percentage in favor of moguls, 2 1/2 per cent. Average train haul, moguls, 41.95 cars, eight wheelers, 41.24. Two empty cars rated as one load.

Mr. L. Finlay, Master Mechanic of the St. Louis, Iron Mountain & Southern Railroad, writes that they have only eight-wheel engines on the Arkansas division of his road, can give no comparative data, but considers the ten-wheel engine the best for heavy freight service, all things considered. (Form enclosed.)

Engines.	Size cylinder and stroke.	No. driving wheels.	Diameter of driving wheels.	Weight on drivers.	Total weight on wheels.	Kind of fuel.	Average grade.	Total cost per mile run.	Average cost per car per mile hauled.	Remarks.
8 wh.	15" x 22"	4	4 1/2 ft.	30,700	59,800	wood		16.14	28 loads full train.	
"	16" x 24"	4	4 1/2 ft.	41,300	66,400	"		16.94	32 loads full train.	
"	16" x 24"	4	4 1/2 ft.	38,700	63,000	"		16.89	33 loads full train.	

Mr. W. O. Hewitt, Master Mechanic of the Toledo, Peoria & Warsaw Railroad, replies that they have but one class—the eight-wheel engine—on his road, and sends form filled up complete, giving data of performance, with cost of same.

Engines.	Size cylinder and stroke.	No. driving wheels.	Diameter of driving wheels.	Weight on drivers.	Total weight on wheels.	Kind of fuel.	Average grade.	Total cost per mile run.	Average cost per car per mile hauled.	Remarks.
8-wheel.	16x24 in.	4	4 1/2 in.	42,500	61,500	Bit'm coal.		13.77	0.083	

From a statement received of the performance of a consolidation engine working on a mountain grade of 184 feet to the mile on the New Mexico & Southern Pacific extension of the Atchison, Topeka & Santa Fe Railroad, we find this engine hauled 258 1/2 tons, not including weight of engine, on the above grade at a speed of eight miles per hour. The work done by this engine is considered by the officers of the road equal to what could be done by two ordinary engines of the American or eight-wheel class. Dimensions of the engine are as follows: Cylinder, 20 x 26 in.; total wheel base, 22 inches; diameter driving-wheel, 43 in.; weight on driving-wheels, 100,000 pounds; total weight of engine in working order, including water in tank, 115,000 pounds.

NOTE.—This engine has a tank on the boiler and is known as "Uncle Dick."

Mr. Woodcock, Master Mechanic Central Railroad of New Jersey, furnishes a statement of the performance of a consolidation engine, cylinder 19x24 in., used on that road. This engine has made a total mileage during the past year of 40,025 miles, with an average cost of repairs of 2 8-10 cts.; fuel, 7 8-10 cts.; stores, 8-10 cts.; engineer, fireman, and wipers, 5 9-10 cts.; total, 17 3-10 cts.; miles run to ton of anthracite coal 19 6-10; weight of train hauled in tons, exclusive of engine and tender, 785 tons; average grade, 21 feet to a mile. These items are taken from printed, annual statement of 1879. He also states they have just received and put into service eight new consolidation engines, cylinders 20 x 24 in., to be run in the same service as the former engines and thus far they are pleased with the manner in which they perform their work.

Your committee are of the opinion that the consolidation engine is destined to be the coming engine for heavy freight service. They have received a statement from the Baldwin Locomotive Works (where the first consolidation engine was built in 1866, and placed in the service of the Lehigh Valley Railroad) giving the number of this class of engines built at their works in comparison with the ten-wheel and mogul engines from 1866 to 1879 inclusive, as follows:

YEAR.	Ten wheelers.	Moguls.	Consolidation.
1866.....	34	1	1
1867.....	7	1	8
1868.....	52	5	9
1869.....	144	3	3
1870.....	48	8	7
1871.....	61	30	4
1872.....	149	53	6
1873.....	19	50	9
1874.....	19	23	2
1875.....	11	19	15
1876.....	15	30	9
1877.....		48	17
1878.....	7	84	18
1879.....	33	41	110
Totals.....	590	405	216

This statement shows a very large percentage of increase in the mogul and consolidation engines—particularly in the last few years.

In conclusion, your committee are of the opinion that for heavy freight service, and with a speed not to exceed twelve miles per hour, the consolidation class is best adapted, all things considered for general freight service, and with a speed not to exceed fifteen miles per hour, the mogul engine will give very good results. For fast freight, and where a speed of twenty miles an hour is sometimes necessary, the American or eight-wheeled engines would no doubt be most economical.

Your committee would here take opportunity to return thanks to the members who have replied to their circular, but regret that they have not received more data, especially from the members using the consolidation engines, in order that they might present to the association comparative statements.

Very respectfully,  
WM. WOODCOCK, M. M., Cent. R., of N. J.  
S. A. HODGMAN, M. M., P. W. & B. R. R.  
Committee.

REPORT OF THE COMMITTEE ON THE BEST MEANS OF PREVENTING NOISE FROM SAFETY-VALVES.

It does not seem advisable to your committee to make a report of the usual kind on the subject submitted to them. The devices are of such a simple nature that no elaborate description or drawings are necessary to describe them, and

the results to be obtained are so simple that no extended experiments are needed to determine the value of any given plan. A description, therefore, of the various devices would simply have the value of a catalogue; and as the plans are patented, it does not seem to your committee that any useful end would be served by their describing accurately each device, and adding to such descriptions the opinions of various parties as to the relative value of each. Speaking then simply in general terms it may be said that the devices prominently before the public for this purpose are of two kinds; in the one, the stream of escaping steam is finely separated before reaching the open air usually by passing through a chamber, and thence to the open air through a number of small holes or fine tubes or through layers of glass beads. The second method is to prevent the steam escaping into the open air at all, and to convey it by pipe to some large reservoir. In locomotives this is usually the tender. When the first method is applied to safety-valves it is open to the objection that it interferes with the delicacy of the adjustment. It is not merely that it creates a back pressure, but, what is a greater evil, the back pressure is variable in its action, making the valve unreliable.

The second method avoids this trouble and has the advantage of utilizing some of the heat that otherwise is entirely lost. There is another advantage which though incidental is none the less real and indeed forms a very valuable feature. We refer to the heating of the water in the tender. This acts as a very decided check on extravagant methods of firing, for though it is very beneficial to have feed-water moderately heated (say less than 120°), a higher heat will give the engineer great trouble with the injectors. Excessive blowing off of steam will overheat the water, and engineers having once experienced this trouble will be more careful of their fire in future.

With many engineers this check alone leads to a surprising economy of fuel. The difficulty of controlling the fire with engines of present construction will also be made apparent to those who design them, and this will probably lead to their engines getting proper ash-pans with tight dampers so that opening the fire-door will not be the sole means in the engineman's power to regulate the fire.

In conclusion your committee beg to urge upon the association the importance of dealing with this question. The noise of escaping steam, especially from safety-valves, ought to be regarded as an intolerable nuisance and a disgrace to those in charge of locomotives. We hope to see the day when engines will be built with sufficient care, and enginemen trained with enough intelligence, to render the application of any special device for hiding the evidence of neglect unnecessary; but at present we are driven to use such special means for accomplishing the desired end, and in doing so it is best to hide not only the sound but the sight of the steam, for both add to the distractions already too numerous in railroad working.

HOWARD FRY,  
GEO. RICHARDS,  
W. F. TURRIFF,  
Committee.

AN EXPERIMENT ON THE CHANGE OF TEMPERATURE OF STEAM DURING ITS STAY IN THE CYLINDER OF AN ENGINE.

I am induced to transmit to this association this record of an experiment made through the kindness of Mr. Warren, in the hope of interesting others in a subject which may become of more practical importance than it may seem at the present time.

That steam of different pressures, has also different temperatures, is too well known to need any comment, but the rapidity with which change of temperature follows change of pressure, is, perhaps, less clearly appreciated.

It was first shown experimentally, by Mr. G. B. Dixwell,\* of Boston, that in ordinary engine cylinders the temperature of the steam changed during every stroke, and that very important consequences followed therefrom. The instrument used by Mr. Dixwell consisted of a delicate metal pyrometer; devised by him, and placed in a groove cut on the inner face of the cylinder-head.

The instrument used in the experiment to be described, is presumed to be less sensitive than that used by Mr. Dixwell, the results being no less interesting on that account, but of less value than if one of his instruments had been used.

The instrument used by the writer consisted of a silver tube 6" long by 3/8" external diameter and 1/8" thick. This tube was exposed to steam from the cylinders on the outer surface only, and when expanded by a rise of temperature gave a motion to the index of an ordinary pressure-gauge by means of a cam and toothed gearing moved by a rod fastened to the tube at one end and passing through it. The graduation was obtained by direct comparison with a good thermometer.

When this instrument is attached to the cylinder of an engine moving slowly, the index shows nearly the whole change of temperature to be expected from the tables of the properties of steam (125° for 120° of steam for example), but at higher speeds the movement grows less.

On the 24th of April, 1880, the instrument was placed on the front end of the left cylinder of engine No. 11, running train No. 3, on what is known as the Cairo Short Line (St. L., A. & T. H., B. & S. I. Div.). The train was a light passenger train, and the engine ran throttled except at the highest speed, which was made on an up-grade for a few minutes.

The changes of temperature were watched for thirty-three miles with the same results:

At 50 revolutions per minute.....	120° F. change
" 100 " " " " " " " " " " " "	60° " "
" 200 " " " " " " " " " " " "	30° " "
" 300 " " " " " " " " " " " "	20° " "

From the above notes certain conclusions might be drawn, but the only one which the writer has confidence in, is that a very large loss of heat takes place up the stack by radiation into the exhaust steam from the heated surface inside the cylinders, by no means a novel conclusion, however. It would appear that at high speeds this loss is constant for time only, and is not dependent on the speed, while, as the power exerted varies with the speed, the proportion so lost is greater at low speed and less at high speed. The beautiful simplicity of this inference may be entirely due to lack of delicacy in the instrument used, but it is rendered probable by the fact that the hot metal of the cylinder is open to the exhausts half the time at all speeds, and may lose the same amount of heat thereby.

Some very alarming computations can be made as to the amount of heat lost in this way by assuming the iron surface to radiate at the same rate as the silver surface, but we have no right to make such an assumption, and we will refrain from the figures. It is, however, the intention to repeat the experiment with iron surfaces in place of silver, thereby hoping to obtain reliable data for such computation, and when the magnitude of this evils established in your minds, some remedy therefore may be obtained.

Respectfully, CHAS. A. SMITH.

St. Louis, May 8, 1880.

\* Mr. Dixwell's experiments are mentioned by him in a paper read before the Society of Arts in Boston, on April 29 and May 13, 1875.

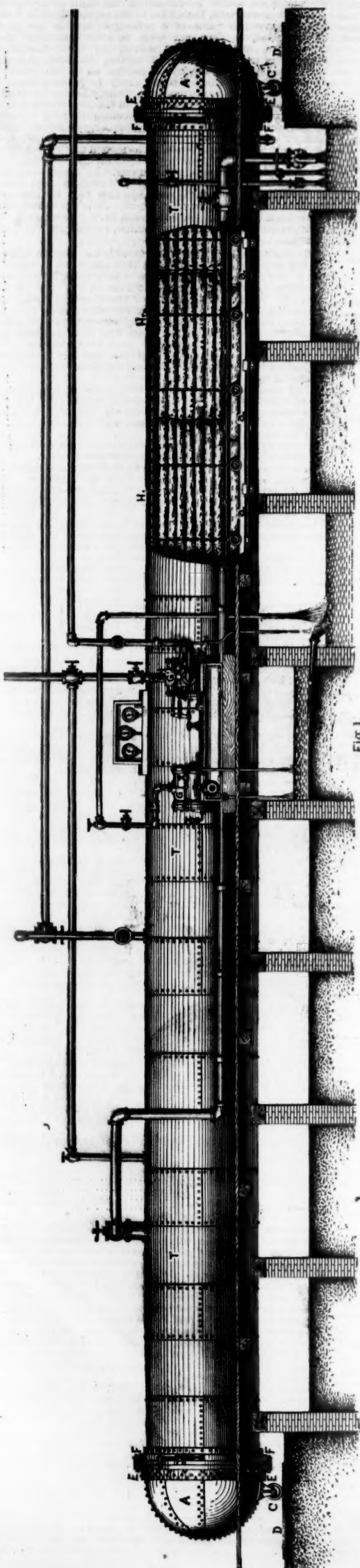


Fig. 1.

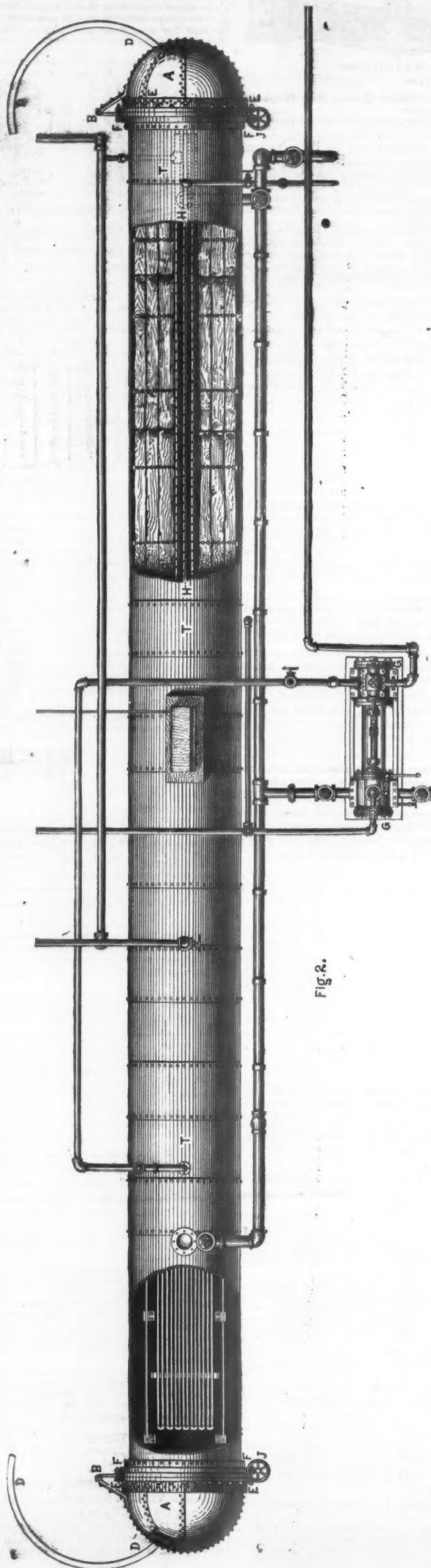


Fig. 2.

# APPARATUS FOR CREOSOTING TIMBER

(Hayford's Process).

At the Works of Mr. Edward R. Andrews, South Boston, Mass.



## Creosoting Timber.

Processes for the preservation of wood from decay date back as far as ancient times. The first English patent granted for such a process was in 1737. Since then "almost every chemical principle or compound of any plausibility has been suggested" for this purpose. It would be a waste of time to enumerate these. It will be sufficient for the present purpose to quote from the same author, who, after enumerating 29 different substances which have been used for preserving wood, concludes with the statement that "the most successful patentees have been Bethell and Burnett, in England, and Boucherie, in France."

Before describing these processes, a brief statement of the theory of wood-preserving will perhaps make the subject more clear to some readers.

It may be said, briefly, that the mass of the stems of our forest trees consists of *woody fibre*, with intervening cells or tubes through which the sap ascends to the leaves and from them descends, and at the same time deposits its secretions and thus forms the new or sap wood and contributes to the growth of the tree. Among the other ingredients contained in the sap is *albumen*, which is described in Tomlinson's Encyclopædia as "an organic nutritive principle, the chief ingredient in the white of eggs, and in the fluid portion of the blood. It also occurs in the sap or juices of vegetables. \* \* \* Exposed to atmospheric air, it soon putrefies, but if a thin layer be spread out and exposed to evaporation, in a warm place, it dries up to a pale yellow, brilliant gum-like substance, in which state it may be preserved for any length of time, the presence of water being in all cases necessary to putrefactive fermentation."

The decay of wood is primarily due to the fermentation of the albumen of the sap, and, as indicated above, this process requires moisture and is stimulated by warmth. The destructive agent in the decay of wood, though, is not due to this fermentation, but to the growth of countless myriads of fungi, which require such fermentation or putrefaction for their development. One of the marked characteristics of fungi in general is their very rapid growth and wonderful reproductive power. The fructifying organs of these plants are so minute, that without the aid of a powerful microscope they cannot be detected. To the naked eye, a fine dust ejected from the plant is the only token of reproduction. This excessively fine powder is no other than innumerable myriads of the reproductive spores or seeds of the fungus, which, under favorable conditions, germinate and grow with almost inconceivable rapidity. It has been ascertained, though, that vegetable corruption is essential to the germination of these spores, and this is always preceded by fermentation. Therefore if we prevent fermentation we at the same time prevent decay, consequently:

1. As the presence of moisture is essential to the fermentation of albumen, if we can remove and exclude all humidity from the wood it will prevent the first stage of decay.

2. Albumen in a coagulated or semi-solid form is less disposed to fermentation than it is in a fluid state. That it may be coagulated by heat is shown by its effect on the white of an egg in boiling it. Metallic salts and other substances will also unite with albumen and coagulate it.

3. Fermentation may be prevented by injecting into the cells of the wood what are called antiseptics; that is, substances which have the quality of counteracting or arresting fermentation and putrefaction.

The various processes which have been used for preserving wood all aim to accomplish one or more of these ends.

Burnett's process consists of an injection of *chloride of zinc* into timber, in proportion of about 1 pound of the salt to about 9 or 10 gallons of water, forced into the wood under a pressure of 150 pounds per square inch. Professor Graham wrote of this process that "the oxide of zinc appears to alter and harden the fibre of the wood, and destroy the solubility, and prevent the tendency to decomposition of the azotized principles it contains by entering into chemical combination with them." The objection to this process is that the salt is very soluble, and therefore, if the wood is exposed to the weather or the action of the water, the preservative ingredient is liable to be washed out of the wood, although it is claimed that this does not occur to an injurious degree. This process is much used in Germany.

M. Boucherie's process consists in causing a solution of *sulphate of copper* to penetrate to the interior of freshly cut woods. This process was used on the Belgian railroads up to 1859, but was then abandoned.

"Messrs. Lége and Fleury-Pirronet's patent for the injection of sulphate of copper into beech and poplar is as follows: After the wood is placed (in the tank) and the opening hermetically sealed, a jet of steam is introduced, intended at first to enter the timber and open its pores for the purpose of obtaining a sudden vacuum, so as to establish at any time a communication between the interior of the cylinder and the cold water condenser; at the same time the air-pump is put in action. The vacuum caused is very powerful, and is equal to 25½ in. of the barometer. Under the double influence of the heat and the vacuum the sap is quickly evaporated from the wood as steam, and ejected from the cylinder by the air pump, so that in a very short time the wood is fully prepared to admit the preserving liquid through the entire bulk."

Bethell's process, which was patented in 1838, "consists in impregnating the wood throughout with oil of tar, and other bituminous matters containing creosote, and also with pyrolignite of iron, which holds more creosote in solution than any other watery menstruum."

The appliances used in Bethell's process are described as follows in Britton's book:

"The tank or cylinder is about 6 ft. diameter and from 20 to 50 ft. long. \* \* \* Pipes are led from the cylinder to the air and force pumps; the air (it is said) is not only extracted from the interior of the cylinder, but also from

the pores of the timber. When a vacuum is made, the oil, which is contained in a tank below the cylinder, is allowed to rush in, and, as soon as the cylinder is full, the inlet-pipe is shut and the pressure-pumps started to force oil into the wood; the pressure maintained is from 150 to 200 lbs. to the square inch, until the wood has absorbed the required quantity of oil, which is learned by an index-gauge fixed to the working tank below. All cylinders are fitted with safety-valves, which allow the oil not immediately absorbed to pass again into the tank. The oil is heated by coils of pipe placed in the tank, through which a current of steam is passed from end to end, raising the temperature to 120°."

Hayford's process, which is now in use in this country at the works of Mr. Edward R. Andrews in South Boston, Mass., and at Elizabethport, N. J., the apparatus of which is illustrated herewith, consists in the use of creosote as the preservative agent, the same as in the Bethell process. With the latter, though, only dry wood can be effectually treated. Thus Mr. Braine, the Superintendent for J. Bethell & Co., of London, is reported to have said, in 1876, that "dryness is the principal quality required in timber that is to be creosoted. Timber is sometimes delivered dripping wet, and the creosoting-firm expected to creosote it without delay. \* \* \* It is perhaps better that timber should not be creosoted at all than creosoted moist." As timber in this country is very generally used while quite green, or only partly seasoned, it is evident that a process which would require dry wood could have only a limited application here. The Hayford system, it is thought, provides for this difficulty. It consists of improved processes for preparing wood to receive any preservative substance required, and apparatus for injecting such substance into the pores of wood thoroughly and rapidly.

It is in many respects similar to the process of Messrs. Lége and Fleury-Pirronet for injecting sulphate of copper into timber.

Before describing the process, the construction of the apparatus used (which is illustrated in the engravings) will be explained. Fig. 1 is a side view, fig. 2 a plan, and fig. 3 an end view of the plant used at the works of Mr. Andrews

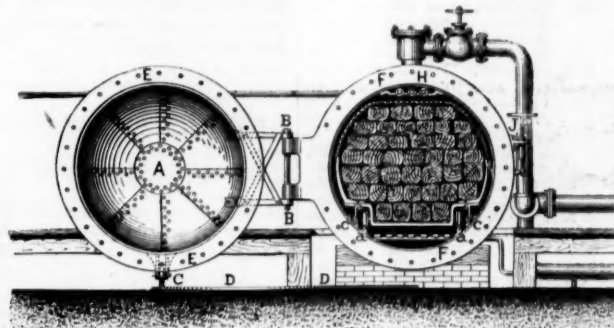


Fig. 3.

at South Boston. The main portion of these is the tank T T, which is made of heavy boiler plate, and is 6 ft. in diameter and 100 ft. long. This tank has strong hemispherical heads, A, A, at each end, which are arranged so as to be readily opened for admitting or removing the timber to be treated. The heads are each swung on a hinge, B, the weight being carried by a wheel, C, which runs on a semi-circular track, D. Each of the heads has a heavy gun-metal ring, or flange, E E, riveted to it, which is bolted to a similar flange, F F, riveted to the end of the tank. The joint between the two flanges is made with a rubber gasket, the two being bolted together by a series of bolts in the usual way. As it would be very inconvenient and tedious to remove the nuts from all the bolts every time that the door is opened, an ingenious arrangement is provided that makes this unnecessary. Each bolt has a slotted head or eye, into which fits a key attached to a metal ring on the inside of the flange attached to the tank. This ring is provided with a screw and hand wheel, J, so that it can be made to revolve a short distance. As the keys for the bolts are attached to this ring, as it revolves they engage in the eyes provided for them. It is then only necessary to screw up the nuts a few turns to tighten them, and to remove the head they need only be slackened enough to release the ring carrying the keys.

The timber is loaded on trucks which run on a track formed of two rails, a, a, figs. 1 and 3, which are laid inside of the tank. The timber is chained down on the trucks, and the latter are held down by hooks, c, c, fig. 3, so as to prevent the buoyancy of the timber from floating it when the tank is filled with creosote. G, G', is a steam pump, which can be used either for pumping liquids, for exhausting the air from the tank, or for forcing air into it. A water-jacket around the air-chamber keeps it cool while in operation. Along the top of the tank, extending its whole length, are a series of perforated pipes, H, H, through which the creosote is admitted, and distributed over the timber until the tank is filled with oil. On the bottom of the tank is a series of steam pipes, shown at the left end of fig. 2 where the shell of the cylinder is broken away, and also at the right end of fig. 1 and in fig. 3. Steam constantly circulates in these during the whole process.

The process of treating wood with this apparatus is described as follows by Mr. Andrews, the proprietor of the works at Elizabethport and at South Boston:

"The wood to be treated is placed upon iron cars, and run into the cylinder, which is hermetically closed. Steam is then admitted through the coil in the cylinder, and, after passing through the coil, it escapes into the cylinder itself. The temperature in the cylinder very soon reaches 180° Fahr. It rises very slowly from this point, the evaporation of the sap and moisture in the wood tending to cool the temperature. The heat is rapidly absorbed by the cold timber,

and when it is large and very green, several hours are required to heat it through. It is best that the heat should increase gradually and that it should be kept moist. If allowed to be too dry, the outer fibres of the wood naturally harden, and thus prevent the escape of the moisture within. To avoid this, and also to save all the heat, the exhaust from the pump is also admitted into the cylinder. At the same time the air-pump is set at work to force atmospheric air into the cylinder, until the pressure-gauge shows a pressure of 30 to 40 lbs. to the square inch. One object of this is to keep the wood from checking; green wood, in large dimensions, when exposed to high temperature, has a tendency to check. A vacuum forms about the wood, arising from the condensation of steam, and the expansion of the moisture within the wood tends to throw apart its fibres. This tendency is counteracted by the atmospheric pressure above stated. And thus a higher degree of heat can be used in drying the wood without injury to its fibres: 250° to 270° are sufficient to evaporate the sap.

"Another reason for forcing in air is to economize steam, the temperature of which rises in proportion to the pressure. The condensation within the cylinder is so great, that otherwise the requisite heat could hardly be obtained except by the consumption of excessive amounts of fuel.

"During the steaming process, a pipe in the bottom of the cylinder is kept open to allow the escape of the condensation. The time necessary for heating wood through in this process depends upon the quantity of moisture to be got rid of, and the size of the timber. Four or five hours suffice for boards and 2-inch plank, while ten or twelve are required for heavy timber, as wood is a very slow conductor of heat.

"Albumen coagulates at 140°, so that the coagulation of the albumen of the sap—the only result claimed for the Burnettizing and Kyanizing processes—is easily secured; but the sap and moisture cannot be got rid of until they have been turned into vapor. Hence the necessity for continuing the steaming process until it is certain that all the portions of the wood containing sap and vapor have been heated to above 212°.

"When this point is reached, the direct steam is cut off, all valves opened, and the air-pumps kept at work to drive from the cylinder all the steam, vaporized sap and condensation which remain in the cylinder; in other words, to free the cylinder entirely. Heat is constantly maintained through the radiation from the steam coil. We then commence to pump a vacuum.

"The effects of the steaming of the timber are now apparent: if a cold vacuum had been pumped, when the cylinder

was first closed, it could be easily done in less than an hour, but no water would have come through the pump, and the wood would not have parted with its sap. It is a common mistake to suppose that a vacuum alone will withdraw sap from wood. But after steaming, when the sap has been turned into vapor, then it and the air as well are drawn out by the force of the vacuum pump; yet the vacuum is reached very slowly, on account of the vast quantity of air and moisture in the wood; five or six hours often elapse before the gauge indicates 24 or 26 in. of vacuum. But the sap having been withdrawn, the vacuum extends into the interior of the wood, if it can be properly so expressed, so that when the oils are let in they are absorbed into the very heart of the wood.

"This brings us to the last step in the Hayford process, namely, the impregnation with the preserving material. During the drying process, steam has been admitted to the coil in the oil-tank, bringing the temperature up to about boiling point, to render the oils very limpid and penetrating. Creosote oil is heavier than water, weighing about 9½ lbs. to the gallon; it congeals at about 60°, so that heat is needed to make it flow freely.

## IMPREGNATION.

"I have previously explained to you that the oil is admitted to the cylinder through a series of perforated pipes (H), arranged around the inside of the cylinder. A pressure of about 60 lbs. to the square inch is brought to bear upon the top of the oils in the oil-tank; this pressure, together with the drawing force of the vacuum, make a force of about 75 lbs. to the square inch, with which the oils are sucked and driven into the cylinder. Every stick is at once bathed with oil. The wood—being in a soft, somewhat spongy condition, the fibres porous, and the pores open—absorbs at once the hot, penetrating oil. If the wood be of a porous character, like pine, it absorbs all the oil required by the time the cylinder is filled, without any pressure; but if the fibre be solid and close, and the timber of large size, a further pressure of from 60 to 100 lbs. is needed during a certain length of time to make the impregnation complete. But the wood having been put into a condition to absorb the oil, the impregnation is more thorough than by the Bethell process, used in Europe, where no other means are relied upon than pressure upon hard, air-dried timber in a cold vacuum.

"The process is now completed, and the doors at either end being opened, the lumber treated is withdrawn, and another charge takes its place.

## VALUE OF PROCESS.

"Now let us retrace our steps, and see whether, practically as well as theoretically, the advantages claimed for the Hayford patents have been realized.

"It has been shown that to preserve wood from decay, it must be placed in the following conditions:

"1. It must be rendered non-fermentable by the coagulation of the albumen of the sap.

"2. Dryness must be secured by the abstraction of the sap and moisture contained in it, as well as any sugar or acids, which would have a tendency to ferment.

"3. Dryness and a pure woody fibre being secured, these conditions must be maintained by protecting the wood in some way from air and water afterwards.

"In reply, I claim: First, that inasmuch as albumen coagulates at 140°, and that all the sap containing albumen is to be found in the sap-wood, and that it has been steamed to

\* A Treatise on Dry Rot in Timber, by T. A. Britton. Spou.



240° or 270° Fahr., the albumen has thus been rendered non-fermentable. Moreover, creosote oil contains the most powerful coagulator of albumen known to science—carbolic acid; hence, when injected into the pores of wood, it doubly secures it from fermentation.

Secondly. By the action of the steam heat, and the subsequent use of the vacuum pump, the sap and water held in the wood have been vaporized and withdrawn from the pores of the wood, leaving a pure woody fibre. Nothing liable to ferment remains in the wood.

(This system of drying lumber can be made very valuable for carpenters. In twenty-four hours green lumber can be seasoned more completely than in an ordinary dry-house in six weeks. For this purpose the drying process should be continued for some time after the vacuum has been reached, the heat being kept up by the radiating coil of pipe).

Thirdly. Freedom from liability to fermentation and dryness being secured by the earlier processes, the wood is made water-proof and air-tight by injecting the pores with creosote oil. Decay requires air, moisture and heat for its development. The air and moisture having been withdrawn and the pores filled with oil, heat alone can do no injury.

When forced into the pores of wood at a high temperature, it works its way through the pores until it covers every fibre with a protecting film. It resinifies in the outer pores, impregnating there, and being insoluble in water, it forms a water-proof and air-tight covering to the wood, and maintains absolute dryness. No matter where the wood may be exposed, it is protected from absorbing any fermentable substance. Hence, decay is rendered almost impossible.

The preservative qualities of the heavy oils of tar are not due, solely or chiefly, to one or more of its component parts, although several are esteemed highly as preservative substances; but their efficacy is due, chiefly, to the thick, greenish oil itself, which is insoluble. It is this quality, insolubility, which gives to the heavy oils of tar their superiority, as preservatives, over chloride of zinc, sulphate of copper, or corrosive sublimate. These latter only coagulate the albumen, they offer no protection whatever to the wood itself; the woody fibres are as much exposed as ever to absorb destructive agents. But when wood has been injected with creosote oil, not only is the albumen coagulated, but the whole structure is so absolutely protected, both chemically and mechanically, that its indestructibility is assured, except from actual wear. It is benefited on this score, also, as it becomes harder by time. Creosoted wood is the only wood which seems to improve with age. The oil seems to metallize the fibre like iron. Soft wood becomes hard, like oak. Sap wood becomes as hard and durable as the heart-wood.

In the early part of my remarks I stated that the Hayford patents for preserving wood covered a system which is adapted to the wants of this country. This is mainly, as you have observed, because it is able to cope with green lumber. It can receive it from the saw-mill, and in 24 hours thoroughly season and preserve it. In fact, to do the best work it is essential to have green wood. It is precisely in this condition, that wood will readily absorb creosote oil, when the moisture has been withdrawn. In a living tree, the fibres and pores of wood are not hard and flinty, like those of kiln-dried or air-seasoned lumber, but are soft and porous. The cells act as so many millions of pumps, to transmit the sap from the roots to the leaves and return it again to form the annual layer of wood growth. When the sap has been withdrawn from wood in this condition, as has been described, without hardening the fibres, the cells and fibres are just as ready to receive or transmit creosote oil as sap itself.

A discussion of the economy of creosoting timber will be found on the editorial pages.

## Contributions.

### Unglazed Tile for Railroad Under-Drainage.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Omitting the details of a varied experience during the past twenty years with unglazed tile for under-drainage, it is my purpose to present to the railway world a few instances which led me to adopt it on railroads. When this subject is better understood, it will, to a great extent, revolutionize the system of under-drainage, and will become popular, especially with those who are constructing new road-beds—and when they are remote from gravel it is most commended.

Ten years ago, in the drainage of a suburban property, near Dayton, O., where the substratum is a heavy clay, and where it became necessary to place the tile eight feet deep, to afford a proper drainage for the cellars, six-inch unglazed tile of this pattern (see fig. 1) were placed in the

FIG. 1.



trench and covered with yellow clay, firmly packed around the tile, taking care not to displace them. After this the trench was filled. Since then the drain has never failed to carry off the water, and, from present indications, it will last many years.

The practice of covering the tile with clay, well packed, is adverse to the accepted theories of the day; but several well-defined experiments and close observation, have demonstrated the fact that to make a perfect under-drain the water must percolate through the tile itself, instead of finding its way through the ends or joints of the drain; and clay forms a better material to filter through than any other, as it will not disintegrate like sand, loam or debris, to fill the tile. From actual observation and measurements, a tile placed one foot deep will drain a space eight feet each side of the drain, and two feet deep it will drain sixteen feet each side of the drain, and for each foot in depth it will drain each side of the drain at the same ratio as in fig. 2.

Therefore, in the drainage of a road-bed, a drain tile, if placed deep enough below the frost, will take the water from underneath the railroad and the ditches opposite, and do it much better than if a shallow drain tile is placed on each side of the track, as in fig. 3. The most difficult task in putting down these drains, and one requiring much patience, is to overcome the fixed ideas of the laborers and professional ditchers, who will insist in placing sand, gravel, loam, straw, sticks, and other light material over the tile before covering with clay, with the theory of making more

water-way; and sometimes they will allow the tile to be half an inch apart, to allow the water to enter the joints; and so determined are they that in a moment of your absence their ruling passion prevails, and they will not even take them up without an argument. An instance of this kind occurred a few days ago, in the drainage of a clay cut on the Dayton, Covington & Toledo Railroad. This cut had given us much annoyance, and more than two hundred dollars had been expended by the train-men on the clay (it being about the consistence of mortar) which had sloughed off the bank—some of it running over the ties, leaving only the top of the rail to be seen. A trench was dug four feet deep, and the tile placed therein, with clay packing, and the head or source of the drain permanently closed, the workmen protesting against the treatment; but to their astonishment the road-bed is hard and dry to-day, and is a complete success. The total cost of digging the trench, aside from the tile, was only \$21.00, thus making a permanent improve-

### General Description of the Ferryboat "Canton."

TO THE EDITOR OF THE RAILROAD GAZETTE:

The "Canton," built for the joint account of the Philadelphia, Wilmington & Baltimore Railroad Company and the Baltimore & Ohio Railroad Company, is an iron side-wheel double-engine, transfer ferryboat.

#### GENERAL DIMENSIONS.

Length between perpendiculars.....	311 ft.
" over all on deck.....	324 ft.
Breadth of beam moulded.....	36 ft. 8 in.
Depth from base line to top of deck beams in the centre.....	13 ft. 3 in.
Width, over all on deck, about.....	68 ft.

The hull is made of iron, made very strong and substantial, with wooden deck and deck frame. The main deck is planked over from end to end, on which cross-ties are placed, and the iron rails upon the top of the cross-ties for three tracks. The houses for accommodation of the crew

FIG. 2.

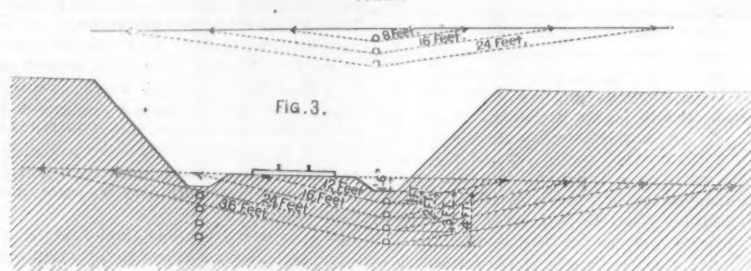
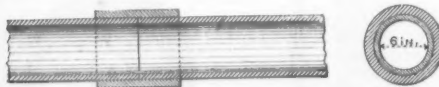


FIG. 3.

ment; while the work of clearing out open ditches in the old manner, besides the annoyance, would have cost much more.

A few miles north of this place, near West Milton, O., the road passes through a depression, with a water-shed of about twenty acres on each side. The road-bed was made of black loam, and when saturated with water the ties, and even the rails, would sink out of sight. Here unglazed tile

FIG. 4.



was laid with the most signal success. While passing over the road, recently, in company with an eminent engineer who has spent a life-time on railroads, he said: "This is new to me, and I am converted" to this system of drainage.

The best tile is the round tile with collars (see fig. 4), as the clay is not required to pack around the joints; besides, they can be laid without much danger of being displaced; but owing to the slight additional cost they have not become popular. They will eventually displace the present horse-shoe tile, as they have the additional advantage of preventing the roots of trees entering the tile and destroying its usefulness.

Much more might be said about the different methods of the past, its progress, etc., etc., and the tools in modern use, but time and space forbid.

J. O. ARNOLD,

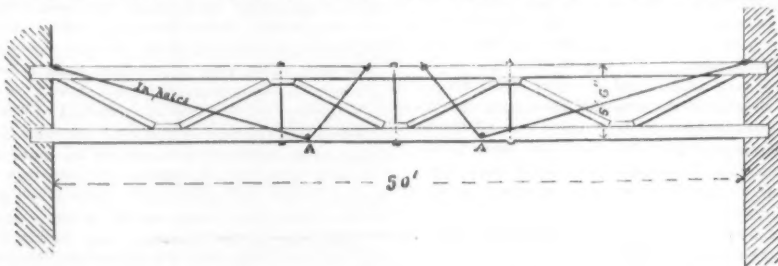
General Manager Dayton, Covington & Toledo Railroad.

### Roof Construction.

MEADVILLE, Pa., May 5, 1880.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Noticing in your last issue a cut and description of the roof over the Madison Square Garden, whose recent fall caused so much destruction to life and property, I thought



the accompanying sketch of what a western architect has been able to originate in roof construction might be of interest to your readers.

Trusses upon this plan were actually erected over a hall to support the roof, and, moreover, the architect seemed so much pleased with his design that he subsequently used it for a hall in another building. I will add that he is not a building mechanic, in whom some ignorance of the theory of strains in trusses might be excused, but claims to be an architect pure and simple.

The diagonal truss rods, which have one end hanging in mid-air upon some imaginary support, are in pairs, and are not fastened at the pins A. A., but are simply bent around them. The course the strains are expected to take through the web, so as to be delivered at the walls (independently of the diagonal rods), is also a curiosity, as the web diagonals are of timber, simply abutting against the angle-blocks. The slope of the roof, which is quite a flat one, is in a plane at right angles to that of the trusses, being from the front to the back of the building. The next truss has a depth of 4 ft. instead of 5 ft. 6 in.

If such designs are to be used for roof construction, is it to be wondered at that they sometimes fall?

J. F. F.

self and to the railroad service were they required to pass an examination before being permitted to take charge of an engine; but the passing of an examination is by no means a proof of infallible intelligence, as witness your correspondent "Certificate 33,102" airing his ignorance of physics by asserting "that it is much harder to generate steam where the water is high than where it is reasonably low." If "Certificate 33,102" really rode with an engineer who kept the pump going till the engine began to prime, and made the size of the fire-door the gauge for coal lumps, that man did not understand his business, and the Master Mechanic of the road would be likely to discover that fact before an engine was run in such a style for many months. Your correspondent, bursting with the importance of his certificate, was no doubt a ready critic, but he must not imagine that his description applies with truth to the ordinary run of enginemen. The various monthly records of mileage performed on our principal roads, with the consumption of stores and cost of repairs, amply exonerate engine-runners from the charges loosely cast upon them by your correspondent. The opinions so confidently vouchsafed by "Certificate 33,102" of how much water ought to be carried in the boiler indicate that he is a blatant novice, far more ignorant

### Do Locomotive Engineers Understand Their Business?

CEDAR RAPIDS, Iowa, May 6, 1880.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of April 30 a correspondent, subscribing himself "Certificate 33,102," makes an attack upon locomotive runners, and attempts to show that the men employed, even on our best managed railroads, do not understand the elementary part of their business. "Certificate 33,102" is doubtless an intensely smart fellow, but he should not suppose, because he represents a certificate, that all the physical and mechanical knowledge in the world is concentrated in his own cranium. Many locomotive engineers are very ignorant, and I think it would be an advantage to them-



of how to manage a locomotive than is the poorest runner to be found among the class he criticises. If "Certificate 33,102" runs the engine of a back-woods saw-mill, he may find "six inches above the heating surface to be sufficient water for a well constructed boiler;" but if he ever runs a locomotive with a heavy train behind him, he will learn, if possessed of ordinary intelligence, that a reserve supply of water often proves of important service. He will learn that a "well constructed boiler" needs an adequate supply of water just the same as a badly constructed one. He will perhaps find out that the temperature of a boiler can be maintained more evenly when a large supply of water is carried, and that all the advantages are on the side of a well-filled boiler so long as dry steam can be obtained. When these facts begin to dawn upon his mind he will also perceive that the ignorance of engineers is not so impenetrably gross as his inexperience imagined. About that time he will also discover that the best locomotive engineers are not farmers' sons straight from the plow, whose entire stock of mechanical knowledge has been acquired by a year or two spent in firing for men almost as ignorant as themselves. And if "Certificate 33,102" has any sense of justice in his composition, he will come to acknowledge that such an assertion was an outrageous slander upon an intelligent class of men.

And about certificates. The training which most men will subject themselves to when they are preparing for an examination is always beneficial, because they have an incentive to acquire knowledge. But a certificate is no proof against ignorance, stupidity and general incompetency. Instead of being badges of ability, certificates as granted to engineers in some states are fraudulent emblems of empty pretense.

A. HELIX.

### The Argument for State Railroad Ownership.

[Document submitted to Parliament by the Prussian Government with a bill to authorize the acquisition of several private railroads by the State.]

(Translated for the Railroad Gazette.)

(CONCLUDED FROM PAGE 255.)

More than all, in the operation of railroads by private corporations, the principle of equality, the uniform treatment of all shippers, seems endangered. It suits the interests of the railroad proprietors to favor large shippers in preference to the smaller ones, and, by means of secret favors of all kinds, to divert the most important shipments from the competing lines. The opportunities of securing secret favors to particular shippers are so manifold that their effectual hindrance by means of the state supervising power is impossible. Rebates on freights may be made through a second or third party, by means of the secret interposition of agents who are appointed for the purpose of regulating and securing the business of a certain competing route, through the mediation of the foreign railroads concerned, as well as by pre-arranged connivance in admitting and allowing fictitious or unfounded claims, etc., and so may be covered and withdrawn from public as well as official control. The many facilitations of traffic in which a consistent business-like treatment of the public finds expression, the provision of space and arrangements for storage, the exemption from storage and warehouse charges, the attention to the peculiar wishes of the shipper in the matter of the position of his cars, and even the injurious practice of giving free passes to the chief shippers and showing them favors in the way of contracts for supplies and labor for the road, render possible an illegal preference of the interests of one before those of another. The large shippers, the best customers of the road, are readily granted all these favors and privileges, while the smaller shippers are held to the strict letter of the regulations. The more the competing interests of the different roads necessitate cultivating the large shippers, the more this system of secret favors is likely to flourish. How is it then when the owners of great manufacturing establishments situated on the line of the road, of great commercial houses which ship their freight by it or have an interest in the financial credit of an enterprise, succeed in entering the board of directors which controls the administration and operation of the road?

The organization of a joint-stock company does not prevent the possibility of the operation of a railroad being brought into a condition of complete dependence on some other industrial undertaking, nor does it ensure that the directors of a private railroad company shall not be interested in a series of other enterprises whose successful operation is dependent upon their business relations with the railroad, so that the management of the road may be directed and governed, not so much in its own interest as in the interest of some other business, often enough opposed to that of the road. Against such an organization, which by reason of its abundant means, and by effective channels, often leads astray and corrupts public opinion, even the influence of the government is powerless, the principle of equal treatment of all railroad shipping interests becomes an empty form, and legislative regulation nothing but a meaningless phrase.

Even if it were possible to imagine, that not only in the legislation, but in the organization of the supervisory authorities, the duty could be so thoroughly performed that in reality an effective protection of public interests with relation to private railroad management were possible, it is evident that with the exercise of such a thorough system of government control, reaching into every branch of the management and operation, and touching on the most vital interests of the corporation, the existence of a profitable and independent system of private railroad management could not be maintained. The regulations enforced by the supervisory authorities restrict and hinder the free disposition of the administration, endanger and damage, under certain circumstances, the earning capacity of the road, and make such demands on its financial capacity that the enterprise of the corporation may become heavily burdened and its income greatly reduced. Whether, in consideration of the want of economy entailed by the costly divided operation and unreasonable competition that accompanies the private system, a paying private operation of the railroad system is possible for any length of time, may be passed by. In any case, private capital will show little inclination to share in an undertaking, the operation of which is subject to extensive restrictions and interference, and the profitable nature of which may be rendered doubtful on account of the rules imposed by the supervisory authorities. On the other hand, the accomplishment of their object by these supervisory authorities is in great measure dependent on the means at command by the different corporations, and their financial retrogression is accompanied with danger to the

very public interests which are protected by government supervision. Often enough the authorities find themselves in such a position that they are obliged to abrogate rules made in the public interests in order to maintain the effective capacity of the railroads and avert the public calamity that would accompany their collapse. For the rest, the maintenance of the working capacity of private enterprises depends chiefly on the management by their own officials and certain other circumstances over which the authorities can exercise no influence, so that the risks of the favorable or unfavorable development of the individual undertakings are unavoidably thrown on the effectiveness of the government supervision. While, therefore, an independent and profitable system of private railroads, in conjunction with a careful and conscientious protection of public interest on the part of the government officials, is an impossibility for any length of time, so on the other hand, an effectual advancement of those interests, so far as they are affected by the private railroads, is only possible when their profitable character, and thereby their ability to fulfil the conditions imposed by the government, is maintained. The private railroad system will therefore be wrecked on the contradiction that is found in the circumstance, that the protection of the important public interests affected by the railroads must be left to private action, and that the same result is expected from the indirect supervision of the government as can only be achieved by direct government administration.

### STATE RAILROADS UNDER PRIVATE MANAGEMENT.

The association of government ownership and private operation of railroads is already practiced in cases where government roads have been leased to private managers. Although this system possesses certain advantages over the exclusively private railroads in the matter of government control of the development of the railroad system, its chief failure is found in the perpetual strife between considerations of profit on the part of the lessee and the public interests, and in fact the experience of the practical application of this system, so far, hardly justifies us in calling it a reform in the true sense of the term. The system has existed, as is well known, for a long time in Holland, and has lately been, although probably only temporarily, adopted in Italy, while the idea of applying it to the reconstruction of a group of several necessitous railroad lines in France was entertained for some time, but after due consideration by the national representatives was dropped. The rental of the Dutch railroads has, up to the present time, yielded an utterly insufficient rate of interest on the capital invested, and at the same time it has been accompanied with so little profit to those renting them, that only a few years since an alteration in the conditions of rental in the interest of the lessee had to be granted by the government. The leasing of the railroad lines in Northern Italy to the corporation formerly owning them must be attributed in the main to the difficulty experienced by the government in assuming the immediate operation of the acquired roads.

The disadvantages that accompany the system of leasing state railroads are certainly sufficiently weighty to counter-balance any advantages that result therefrom. The separation of ownership and employment, as effected by the act of leasing, has generally resulted in collisions between the interests of the owner in maintaining and improving his property and the object of the lessee to increase as much as possible the net profits, attended as a natural consequence with all the evils and dangers to public interests which have been already demonstrated in the discussion of the private system. Against the risk that, in the collision, one or other of the interests must suffer, we may urge that advantages from the leasing of the railroads can only be expected when it is the means of securing business-like operation at the hands of an experienced direction, hereby compassing a more generally useful, thorough and profitable management. This supposition is inapplicable to the leasing of state railroads; operation by the government, equally with private operation, can only be accomplished by experienced, trained officials, and in this direction the state possesses more abundant resources than are at the command of any private management. The results of government operation are therefore by no means behind the average results of the private management. Inasmuch, however, as government administration and operation entail the simultaneous advancement of other public interests, the increased cost could not be counted as an economical loss. Moreover, except where in special cases combined circumstances enforce such a state of affairs, there cannot be imagined any case, where the state railroads are rendered more valuable by leasing them to private corporations than by placing them under government direction. Even the financial advantages to the state, which are anticipated from the income of a settled rent from the lessee in place of the fluctuating receipts of the management, are imaginary. As long as the returns from operations, the lessee's profits, exceed the rental, there is manifestly no financial advantage to the government; but as soon as the profits fall below the rent, there is no further security for the government than the working capital of the lessee. The lessee's credit lacks the foundation with which the ownership of the road endows the proprietor, so that the lessee's operation will lack the resources which are at the command of one who is both owner and operator. The longer the lease, the less frequent will be the opportunities of the government to strengthen and complete its supervisory authority. The shorter the lease, the more bitter will be the collision of the two interests, that of the lessee in obtaining the greatest amount of profit from his monopoly, that of the state in securing the preservation and improvement of the property leased. The creation of dividends, by means of increasing as much as possible the profits of the current working year, is, in the private system, the operation by the owner of his own property, always moderated by regard for the preservation and improvement of the enterprise. In the leasing system, however, this consideration is absent, so that the danger of neglecting the maintenance of the permanent way and rolling stock exists, and it demands the sharpest control on the part of the government to prevent a reckless management and the consequent damage to the leased property. This risk is increased by the fact, that the lessor is always obliged to supply the whole stock of equipment, because the lessee, when his lease had expired, would have no further use for equipment he has furnished, while it is to a great extent indispensable to the owner in order that he may continue the operation of the road. To enforce the keeping in order of the working stock would be to encounter such endless difficulties that the most careful supervision would only guarantee partial success. For the government, moreover, the exercise of any supervision over the lessee management is attended by extraordinary disadvantages, as such control is influenced not only by the fiscal interest of the lessor, but also by the protection of public interests. At every interference of the government with the lessee's management, the question would rise as to whether it was to be regarded as the exercise of the government's supervisory authority or on behalf of the government's rights under the contract. In the latter case the lessor would be amenable to justice, in the former its action would be final. The legal relations existing between the government and the parties who held the leases of the government railroads would then be based on a mixture of considerations for public and private rights,

the determination of which would be attended with difficulties and disadvantages of every description. The duty of the state with regard to encouragement of the development of the railroad system would finally encounter difficulties which could scarcely be avoided if the state railroads were leased out, especially where the holders of a lease of a state road, to which an addition had been built, declined to undertake the operation of the latter. As the independent operation of such short stretches of railroad is generally impracticable, the government would neither be able to work them itself nor to find a suitable lessee for them. To provide for the acceptance of the management of such short lines by the lessee on concluding the contract, would only be possible as far as it might refer to roads already so far built or projected as to allow of the terms of their future operation being made in advance. As the experience had repeatedly in Holland has shown, the government will be dependent for the leasing of its new lines on the good-will of the previous lessee and will be compelled to purchase his willingness by offering the lease on such terms as must prove as disadvantageous to the government as they are profitable to the lessee. For the prospective construction of a network of secondary railroads, the outlook for the future would, under such conditions, be very serious.

### PRIVATE ROADS UNDER GOVERNMENT ADMINISTRATION.

The conjunction of private ownership with government direction of the railroads; that is, the system of government management of the private railroads, certainly insures the government an easier solution of the problem that devolves on it respecting the development of the railroad system. But the development of this system is only possible where, in addition to private railroad companies, a capable and well organized government system of operation exists. This will explain how it is that this system has been most successful in Belgium and with the home railroads. Originating in the necessity of placing the building of new, or the maintenance of established undertakings, under the direct protection of the state, and entrusting the management to its direct care, it finds in the cause of its origin also its historical justification. A number of railroad undertakings, whose necessities called for the intervention of the government, have found here the only means of their completion or preservation. In the case of an extensive participation by government in private railroad enterprises, the state direction is the only effectual means of protecting its interests. In particular, to insure the payment of the interest guaranteed by the state on the capital invested, without government management of the guaranteed railroads, has been found very difficult as long as the independent direction of the road by the corporation finds no interest in the re-imbursement of the guaranteed interest from the receipts. In those instances where the corporation includes both guaranteed and unguaranteed railroads, the overcharging of the first in the division of the common working expenses can hardly be avoided except by government management.

This system, undeniably, is accompanied by many disadvantages that show at once its insufficiency. As is always the case where the ownership and management of the road are in different hands, we find here the collision between the interests of the owner, of the speculative stockholder, and those of the management. The state management will be influenced on one side by considerations of government supervisory powers, on the other by regard for the financial interests of the operator. As the two interests are often sharply opposed to each other, the exercise of government supervision would be likely to be influenced by the dutiful regard of the manager for the interests of the undertaking committed to his charge. More serious still are the collisions between the interests of such enterprises as may be under government management with the fiscal interests of the government itself. As a result of the intricate branchings of the home railroad system, the interests of the different roads come in contact so variously in their countless traffic connections, that the development of the traffic on the extended government railroads depends more or less on their competition with the private roads managed by the state. The task of the government, to unite the cultivation of the traffic of its own lines with due care for the interests of the private railroads managed by it, can only be achieved by means of a reasonable and equitable division of the traffic; yet equal consideration for its own interests and the interest of the enterprises managed by it is attended with such difficulty, that neither the extension of the present relations nor their retention for any length of time is desirable, except in case of the most urgent necessity. Among all the forms of government management of private railroads, as the above considerations indicate, that has the fewest disadvantages and difficulties, in which the interests of the owners depend least on the profits of the road.

Therefore, the most favorable phase of this system, so far as the public interests are concerned, is when the state assumes the complete control of the road on payment of a stipulated annual rent. The powers acquired by the government according to such an agreement very nearly approach those that are entailed by complete ownership, the transfer of which to the state is only prevented for a time, because the legal attributes of a joint-stock company will not allow of the immediate liquidation of the company without serious loss and inconvenience. This form of agreement has repeatedly occurred in the history of the development of the home railroads, and in case of the transfer of the private railroads to government will therefore generally form the basis of the contracts with the corporations which may be the actual owners.

### STATE RAILROADS UNDER STATE MANAGEMENT.

The explanation of the different systems of railroad management, as contained in the foregoing descriptions, will make it plain to the reader that only the union of complete ownership and unrestricted management in the hands of the state, i. e., the pure state railroad system, can fully secure the fulfillment of the task devolving on the government with regard to the direction of railroad matters. Only by the adoption of this system can the economical advantages of united management be obtained, without this monopoly of transportation compromising the advancement and protection of the interests of the community. The great advantages of complete unity in the management and operation of the railroads are, according to the explanations contained in Section II., so necessary to the economical interests of the country that the only question left is whether a monopoly by the state or by private corporations is to be regarded as the most advantageous form of unity. If a private monopoly, as just described, is wholly incompatible with the proper protection of public interests, but would render all business requiring transportation dependent on the interests and views of a private enterprise, then a government monopoly, one single transportation establishment conducted by the state for all the railroads of the country, appears to be the only possible form in which complete unity of operation can be accompanied by the protection of the interests of the community.

It must not be expected that the effects of the state railroad management on the economical interests of the country will be entirely independent of its financial results. It stands to reason that the revenue of the administration, in state as in private railroads, will make its influence equally felt on



the rates of transport as well as on the facilitation of other traffic privileges, that the financial possibility of such administrative regulations must be considered with the entire financial position of the administration: since the government administration can as little afford, permanently, to do without a suitable interest on the capital invested in the railroads as can private corporations. But it may be accepted, according to the deductions in Section II., that the financial results of a united government administration will be considerably more favorable than the total results of a divided system of private roads. The savings that would be effected by a united administration of all home railroads cannot be exactly calculated, it is true, but the minimum estimate shows such large figures, that in the purchase a burdening of the state treasury in excess even of the probable average profits would be unimportant. Again, in the case of a single management covering a wide expanse of territory, the scale governing the financial admissibility of an administrative regulation is more uniform, and therefore more reasonable than with a multiplicity of divided directions. The unfavorable results of individual lines can, where they belong to different owners, totally prohibit the trial of regulations of uncertain effect, while in the territory of a great organization, where advantage and disadvantage are distributed over the different lines, the average total results would allow of the experiment without hesitation. The nature of the joint-stock company, the great mobility and facility of transfer of the stock causes a tendency in such administrations to attach more importance to a good income for the time present than to the prospect of a good average result for the future. Administrative measures, which, though they may appear valuable to public interests, do not seem to possess any direct present advantage for the enterprise, and will first show it in the increased profits in future years of operation, will find little sympathy among private railroad administrations. In place of the prodigal dividends based on false economy and the starving of the roads, we have, with the state administration, the general economical and the financial interests of the nation, and the latter is prepared, in consequence of the immense resources of a well-founded national credit at its command, to make even momentary sacrifices and calculate on the future gain, finding its natural limits in the possibility of covering the expenses of a well-ordered national economy, including the interest and sinking funds. Financial interests of this description are not likely to come into collision with the economical interests of the country, as long as these interests remain in accord with sound financial principles, and the source of revenue rests upon sure foundations. The covering of the current expenses of a state is the first and indispensable consideration of a well-ordered fiscal policy, and the propriety of restricting the financial objects of government operative administrations to the amount of revenue necessary to meet those necessities is just as evident.

The development of the railroad with regard both to the technical and the administrative problems of operation—in opposition to a widely spread notion—would not be in the least retarded by the consolidation of the great railroads into one united transportation establishment under government direction. Such development is not so much dependent on the rivalry among the different managements, but to a great extent on the ambitious feeling of emulation existing among the individuals working together in one management. Any stagnation of this progress is not therefore to be feared by the decrease in the number of administrations; on the contrary, we shall rather find that, without considering the incitement from outside interests, through an intelligent co-operation of the government, through the encouragement proceeding from the leading authorities, through the favorable acceptance and well planned direction and union of individual efforts and experiments, it will be found possible to effect a concentrated united working of all able and earnest forces, and thereby induce a more rapid and successful development. In all administrations whose highest utility can only be attained by a unity of disposition, and whose total results depend on the working together of a number of different officials, according to the experience for instance of the post-office and telegraph departments, progress and development may be achieved to a much greater extent by the union and organized direction, than by the disjointed emulation of individual efforts.

#### THE OPPORTUNITY FOR ESTABLISHING THE STATE RAILROAD SYSTEM.

Among all the forms in which the railroad is found in modern civilized nations, the pure state railroad system is therefore the only one that fulfills the requirements of the government railroad policy—uniform regulation within the state boundaries and the advancement of the public interests concerned. Only in this form is possible an economical application of the national capital, on which such great claims are made to effect the construction and operation of railroads; only in this form, moreover, can the direct and effectual protection by the state of the public interests confided to its care be realized; finally, only in this form do we find the possibility of simple, cheap and rational rates for transportation, the certain prevention of injurious differential tariffs, and a just, energetic and effective administration, attentive to the best interest of the whole community. The state railroad system must therefore be regarded as the ultimate form of development of the railroad. How soon this last phase of railroad development will occur in the different countries depends on the characteristics of the country, the form of government, on the degree of necessity, and to a great extent on whether the conditions preparatory to the concentration of the railroads in government hands are more or less favorable. The advantages of concentration are not everywhere equally important, nor are the disadvantages of division alike oppressive, nor are the public interests everywhere endangered to an equal extent by the private operation of railroads. In Prussia we find united in a high degree the pre-requisites of a great, united operating administration conducted by the state. Its limited resources, its economical situation, which demands a strict and careful application of the national capital, necessarily forces the development of the railroad system, and under the present economical circumstances with redoubled power, to the condition called for by the exigencies and the conditions of development, the final energetic accomplishment of which shall be assured by the present measure.

For the accomplishment of the state railroad system in Prussia, the present time also must be regarded as peculiarly favorable, because the condition and prospects of the majority of the home railroads make their acquisition by the state appear desirable, while the favorable condition of the national credit furnishes the means for an arrangement advantageous to both sides. The great fluctuations in the revenues of the separate enterprises, such as have occurred from the vicissitudes of operation during the last ten years, have manifested the uncertain value of railroad shares to such an extent, that the transformation of an uncertain and changeable dividend into a settled and secured income from government, after the troubled experience of the recent past, will be to a high degree welcome to most of the shareholders. While

hitherto the explanation of the decline of railroad receipts is to be found chiefly in the excessive competition caused by the establishment of new connecting lines, there must be added for the future, besides this competition, the increased power of the already extensive government railroad administration and the enhanced requirements of government supervision, as dangerous to the private roads. Although the government has hitherto spared the private roads from exposure to the full power of the state railroad possessions, such a state of affairs cannot continue for long, especially if the demands from antagonistic voices for the increase of the revenue from the government railroads are acceded to. The attainment of an increase of profits by means of higher rates, which would also benefit the stockholders in private lines, the directors of which would certainly immediately follow suit, must be considered impossible. The performance as well as the revenue of the existing government railroad system could only be raised to the desired pitch by a rational consolidation of its roads. Without this, the work hitherto accomplished remains incomplete and faulty in its plan and in its effects on traffic and on the state treasury. To make an end of the present untenable condition of affairs by vigorous measures is a pressing interest of the state that has been repeatedly urged by the government.

In the negotiations concerning the acquisition of the private railroads, it must be taken into consideration that in the hands of the government the object bought, for various reasons, increases to some extent in value. The state is therefore in position to insure to the seller, in giving him his previous income or even a little less, an emolument that he will not be likely to undervalue, and this will be just and reasonable to both parties. To what extent and by what means the state will succeed, with due regard to reasonableness and the government honor, in maintaining harmony with the other party, will be shown by further statements.

#### MASTER MECHANICS' ASSOCIATION.

##### Thirteenth Annual Convention.

On the second day the report of the Committee on Boiler Construction (already published) was read. Mr. Jacob Johann then read a paper on the relative merits of the wagon-top and straight-top forms of boilers, advocating the straight-top boiler as cheaper, stronger, easier to clean if constructed with arched crown sheet and long stays instead of crown-bars, and steaming equally well. The paper was discussed by Messrs. Barnett, McApin, Steel, Setchel and Johann.

Mr. J. H. Raymond, Chairman of the committee appointed to report on the question of methods of committees appointed to select subjects for examination and discussion, submitted the following amendment to Article 5 of the constitution:

"The President shall appoint three members to constitute a standing committee to recommend to the association at each annual meeting subjects for discussion at each succeeding convention, one member for three years, one member for two years, and one member for one year, designating the term each member is to serve, and at each succeeding year one member of such committee shall be elected by ballot. The committee to meet at one o'clock on the second day of the convention each year and report to the Association subjects for discussion to be advanced at the succeeding convention. At 7:30 p. m. of the second day of each annual convention a joint meeting of said committees with an advisory committee composed of the officers of the Association shall meet, and said joint committee at 10 o'clock a. m. of the third day of the convention shall nominate to the Association the several committees on said subjects. Full committees of three or five shall be nominated on subjects to be selected from various parts of the country to be called a Committee of Research, who shall solicit reports from a few of the members upon such subjects and such other subjects desired. The chairmen of said committees shall have power to select their own associates upon such committees, to be called a Committee of Investigation, and said joint committee shall nominate two associate members to read papers at such annual conventions. All committees shall meet at four o'clock p. m. of the third day to plan and devise work for the ensuing year. Each committee will, on or before July 1 each year, send to the Secretary of the Association a circular letter stating the character of subjects desired from members, with a list of persons to whom said letters be sent, to be printed and mailed to such members, with an earnest request for full replies thereto to be returned, on or before April 1 following, to the chairman of such committee. The Committee of Investigation shall, if possible, meet pursuant to the call of the chairman during the second week of April of each year, for the preparation of a report to be forwarded to the Secretary of the Association, by whom it shall be printed and distributed to members. Each report of such committee shall name the members to whom requests were sent but not received."

After some discussion the amendment was adopted and the chair appointed the following as members of the committee: S. A. Hodgman, one year; Jacob Johann, two years; James M. Boon, three years.

On motion the report of the committee on the best means of preventing smoke from locomotives with due economy in fuel, which was read on Tuesday, was again read. The question was discussed by Messrs. Orton and Johann. These gentlemen agreed with the committee that there is no mechanical contrivance to do away with the smoke nuisance unaided by intelligent firing; but that with a large surface of fire-box and a careful fireman the nuisance could be reduced to a minimum. Mr. Cooper mentioned a new device which promised well.

Questions being then in order, the following was proposed: "Are sling-stays from the crown-bars to the outside shell required to hold the crown sheet and make the boiler safe?" was the next subject for discussion. Messrs. J. O. D. Lilly and M. N. Forney were the speakers. Mr. Forney gave a very interesting description, illustrated by diagrams of an English boiler. The peculiarity was in the shape and in the manner of making the joints. The joints were butt joints with single rings for the circumferential and double for the horizontal joints—each with a double row of rivets on each side of the seam. Mr. Forney took occasion to say, in the course of his remarks, that he feared our English brothers are doing a little better boiler work than we are over here, and that while the admission might chafe our national pride, the wise course would be to imitate them wherever they excel.

Before introducing the next question the chair appointed Messrs. John Orton, James Sedgley and John F. Crockett a committee to report nominees for officers for the ensuing year, and Messrs. S. J. Hayes, James Eckford and G. A. Coolidge a committee to report the names of places to be balloted for as their next place of meeting.

The report of the Committee on Prevention of Noise from Safety Valves was then read and discussed by Messrs. George Richards, F. G. Kauffholz, James Eckford, H. L. Cooper, S. J. Hayes, James Sedgley and J. N. Lauder.

The newly appointed Standing Committee reported the following subjects for next year's meeting:

1. Boiler construction and improvements.
2. Shop tools and machinery for manufacturing and repairing locomotives.

3. Best means of attaining a higher economy in the use of bituminous coal.

4. Best form of construction of locomotives for fast passenger service.

An invitation from the Society for Preserving and Perfecting Weights and Measures to attend its meeting was read, and a number attended in response to it.

Immediately on adjourning at two o'clock the members met at the Kennard House and took carriage, whence a portion visited the Standard Oil Works and the others the Otis Steel Works. At both the places lunch was served to the visitors, who had not had time to take dinner, and everything was done to make their tour of inspection both profitable and agreeable.

#### THIRD DAY.

At the opening of the third day's proceedings Mr. Raymond read a paper upon the patent relations of railroad improvements and upon the liability of manufacturers and dealers in railway supplies for royalties upon devices furnished to railroad companies. He dwelt upon the necessity of purchasers of railroad improvements to ascertain whether the same were patented or patentable to avoid future complications and large bills of expense. The paper was heartily indorsed.

The Joint Committee reported the following subjects and committees of research: Boiler Construction and Improvements, Messrs. R. Wells, S. J. Hayes, C. R. Peddie, Jacob Johann and James Eckford. Best means of producing a better combustion in the use of bituminous coal—James M. Boon, chairman. The best form of construction of locomotives for fast passenger trains—W. Woodcock, chairman. Shop tools and machinery for the manufacture of locomotives—H. N. Sprague, chairman.

Messrs. A. L. Holley, of New York, and John W. Hill, of Cincinnati, were the associate members selected to prepare and read papers at the next annual convention. It was suggested that some other subject be added to the list, but Mr. Johann thought the committee had all they could handle in the list submitted. The report was adopted.

A Committee on Resolutions was appointed as follows: Messrs. Forney, Sedgley and McAlpine.

The Secretary read a report from Mr. Howard Fry on "The best means of preventing the noise of escaping steam from the safety valve," in which the hope was expressed that the nuisance would be eventually disposed of. The report was received.

The Committee on Shop Tools and Machinery submitted an interesting report, giving detailed descriptions of new machines and appliances possessing superior advantages for safety, speed and economy in performing work over those now in use. It was resolved that a committee of five be appointed to confer with a similar committee from the Master Car-builders' Association, to consider the subject of standard car-journal, journal-box and pedestal, and report whether any change is desirable from the standard already recommended by that association. A paper prepared by Mr. Charles A. Smith, of St. Louis, associate member, was read on "Experiments made on the change of temperature of steam during its stay in the engine."

The Association then proceeded to elect officers for the ensuing year, and Mr. J. N. Lauder was chosen President; Reuben Wells, First Vice-President, and J. D. Barnett, Second Vice-President. The election of Secretary and Treasurer was postponed one year, continuing Messrs. J. H. Setchel and S. J. Hayes in those offices.

A vote of thanks to Mr. N. E. Chapman, the retiring President, was adopted and a committee appointed to prepare suitable resolutions. The sum of \$600 was voted to the Secretary for his services during the past year.

The Committee on Resolutions reported as follows: They recommend that the thanks of this Association be extended to the Rev. Dr. Charles Pomeroy, Mayor Herrick, the Board of Trade of Cleveland, Cleveland Rolling Mill Co., Union Steel Screw Works, the Chisholm Shovel Works, the Otis Iron & Steel Works, the Standard Oil Co., the Cleveland & Pittsburgh Railway Co., the proprietors of the Kennard House, members of the press, the Committee of Arrangements and other citizens of Cleveland for the services they have rendered and the hospitalities extended to the members of this Association during their stay in this beautiful city. The resolution was unanimously adopted. A recess of five minutes followed. On re-assembling a vote was taken on the selection of the next place of meeting. Providence receiving a majority on the second ballot, that city was declared the choice of the Association.

Mr. Richards, from the Committee on Finance, reported the collection of \$255. Adopted.

Adjourned to meet in Providence the second Tuesday in May, 1881.

After adjournment the members were driven through the city in carriages, and were finally entertained at the Euclid Avenue House, where a very pleasant time was had. Speeches in response to toasts were made by Messrs. Lauder, Ecclesine, Otis, Brooks, Parry, Chapman, Raymond, Claplin, Setchel and Dinsmore, and the gathering finally closed by singing "Auld Lang Syne."

The arrangements for the reception and entertainment of members were excellent, and were most thoroughly appreciated and enjoyed. They were under the charge of the following gentlemen: Committee on Reception and Carriages, Messrs. Henry Chisholm, Wm. Chisholm, W. C. Scofield, L. M. Coe, W. H. McCurdy, S. M. Carpenter, A. M. Wilcox, Frank Billings, J. D. Rockefeller, J. K. Bole, C. J. Woodbury, H. A. Chisholm, C. C. Newton, W. G. Pollock, J. Mowell and T. Maher. Committee on Finance and Printing, Messrs. G. F. Ely, C. A. Brayton, Frank Wilson, S. A. Sague and G. W. Billings, Jr. Committee on Banquet and May Festival, Messrs. C. A. Otis, George E. Stevens, C. D. Ettinger, H. M. Claffin and J. E. French.

#### About Railroad Conductors.

There is no doubt that a conductor's life is comparatively an easy and pleasant one for a man who is obliged to work for his living in one way or another. It is a source of satisfaction to any man to be at the head of affairs in which he is directly interested, if only for a brief period. It is human nature. And from the time his train leaves its starting point to that on which it reaches its destination, the authority of the conductor is supreme and absolute, so long, of course, as he makes his time and abides by the regulations. They are the monarchs of an hour. It is true that the engineer has certain responsibilities of his own, such as "making time," or arriving at or leaving intermediate stations in accordance with a fixed schedule, and running the train into the last station at the precise minute fixed; but in controlling his movements to meet these requirements, he is subject to the action of the conductor, who may seriously interfere, with or without just cause, with the engineer's performances. When the conductor gives the signal, then and then only must the train be started, and if he chooses to stop it at any time or place thereafter it is his right to do so, as it is not generally supposed that he will exercise that right without just cause. He is supposed to know, and unless some one besides himself



has blundered, he does know, all important circumstances connected with his running. If excursion trains are out, he knows where he shall look for or pass them; he knows if any engine is "running wild," so as to cross his path. He understands all the points where he may expect, where he ought, in fact, to meet other regular trains, and he knows when and where he has the right to the road over which he travels, and under what circumstances to grant it to other trains. He knows just how long he may stop at a station without losing time, and he never stops an undue length without good reason. This fact should be considered by travelers who fume and fret and grow unreasonably impatient at a long stop at a station simply because they do not know the reason. They may be sure the conductor has one; and it is in all probability to secure their safety that he delays. People frequently find fault at receiving curt replies from conductors, and in fact all other railway officials, but if they were to take the place of one for a week they would no longer wonder. It seems as if some people reserve all the silly and useless questions they can think of and load themselves up with them whenever they go to travel, and then discharge them broadcast at the long suffering and wonderfully patient conductor, and if they run out of new ones will repeat as often as the conductor comes their way. These bores are on every train, and never allow the conductor or any other train-hand to pass without asking some useless question. They appear never to know whether the station to which they are destined is in this country or in Japan; and invariably after the name of a station has been bawled through the car several times, will ask, "What station did he say this was?" There is no greater display of imbecility in any insane asylum than on most railroad trains. What wonder then that the conductor loses all patience and answers rather curtly. Only the other day an old lady on her way to Montreal, with a dozen hand-boxes and bundles, would frantically gather them up every time the train stopped at a side station and rush for the conductor, and ask if that was Montreal, or if she had to change cars, and every time was told, "No, no, no; you've got 200 miles to go yet; keep your seat." The conductor was growing livid under this continual vexation and probably would have jumped the train and fled in terror, but that a junction was reached where that coach was set off and another conductor took his turn at the rack of torture.

A conductor who leaves the city in the morning and returns in the evening, got off at a small station not far out, the other evening on his return trip. He was approached by a grim-visaged individual who addressed him in a tone that showed he was very much provoked. "Say, did you know that you left me this morning?" The conductor responded pleasantly: "No; I did not; and where was you?" "I was in the depot here." "Well, my dear sir, you must recollect that the depot never goes out. I never load my passengers on with a stretcher. If you want to ride with me you must climb on the train." The angry man was completely nonplussed, and remarking, "Well, that's so," he turned and walked away apparently satisfied.

There are many things which the conductor takes into account that passengers never dream of, and which his associates on the train feel little or no interest about, although they are alert in such affairs as a matter of self-interest. He can tell by his sense of hearing whether all is right, or rather when anything is wrong among the wheels or mechanism of the train on which he rides. When he passes over a bad place in the road he knows pretty nearly what makes it bad, and whether he should give additional warning concerning it at headquarters.—*Albany (N. Y.) Argus.*

#### Grand Chief Engineer Arthur on the Brotherhood of Locomotive Engineers.

At a meeting of members of the Brotherhood of Locomotive Engineers in Chicago, May 16, Grand Chief Engineer P. M. Arthur made a long address, which is thus reported by the *Inter-Ocean*:

It was on the 5th day of April, 1863, that a number of engineers on the Michigan Central Railroad had met at a private house in Marshall, Mich., and talked over the plan of an organization, and then issued a call for a meeting of engineers at Detroit, May 8. At this meeting there had been but twelve engineers, but they organized Detroit Division No. 1. In August, 1864, at Indianapolis, the Grand National Brotherhood of Engineers had been organized with forty-four sub-divisions. In the United States and Canada, they now had 191 organizations.

They took no part in politics. They had established a paper in 1866, and in 1867 had formed an insurance association, which had since paid the widows of deceased members \$1,000,000, and to needy members \$160,000. The Brotherhood gave to the railroads and to the public what the laws of the country failed to do; that was good, faithful and efficient engineers. They did not countenance bad men nor wrong doing, and their claims were based upon morality and sobriety, advancement and protection. Some of the railway officials had advised their engineers to withdraw from the Brotherhood. He did not know why they had done this, unless they realized that in union there was strength, and the engineer could no longer be imposed upon. There was no other object in the Brotherhood than that of advancement and protection. Other departments of the industry and commerce of the world had their unions for protection. The merchants met at the Board of Trade to labor for their own protection, and it was so in all other business interests. Then why should the engineers be charged with a dishonest motive in organization? All the trouble with railroads in the last few years had been charged to the Brotherhood, and it had been said that P. M. Arthur, the Grand Chief Engineer, had planned and controlled all the strikes.

In referring to the strike of 1877, he said it was not a strike of the Brotherhood, but was due to the reduction of wages all over the country. The Chief Engineer had been called in to aid the settlement of a number of roads, and in all such cases a peaceable settlement had been effected. The laws of the Brotherhood required that whenever there was trouble between members of the Brotherhood and the companies, that the Chief Engineer should be consulted. If, then, a peaceable settlement could not be effected, it was his duty to notify the Grievance Committee, who should examine the case, and if they found that the men were justified in stopping work, they notified the Chief Engineer, and he gave notice to the company. As Chief Engineer he had never ordered a strike nor advised one. All he had done was his duty, which the companies should be thankful for. In all the strikes that had occurred he had notified the Superintendent from six to twelve hours in advance unless the Brotherhood was recognized at a certain hour every train on the road would stop. The Superintendent alone was to blame for trains being stopped at inconvenient points. He knew that the train would not go through, and had no right to sell tickets and send it out. Such had been the trouble on the Central New Jersey Railroad. The Superintendent, Col. Ricker, was entirely to blame for the strike. He had refused to in any way recognize the Brotherhood when he knew that he would resign; had already sent in his resigna-

tion to take effect at a certain date, and at that time had caused the strike.

The speaker then reviewed the history of the strike on the Grand Trunk Railroad.

In all strikes the engineers had resorted to no intimidation or threats, but had always been willing to have a peaceable settlement. Some of the companies had charged that the Chief Engineer had interfered between them and their engineers, but he had only performed his duty, as called upon by the brotherhood, and had never done just what he did he would have been dismissed the same as any engineer who had neglected his duty. In the fight with the Reading road and the Boston & Maine road, the engineers had been whipped, but it was not by the directors of the roads, but by men who called themselves engineers, who took their places.

The brotherhood did not ask to be admitted to the companies how many men they should employ or what they should pay them. Its aim was to make good men of its members, and he could point to hundreds of men who had been made better by becoming members. They had been called socialists and communists because they had had trouble in the last few years, but this trouble was off due to the superintendents or general managers of the roads.

#### Transportation in Congress.

In the Senate on the 13th:

Mr. Voorhees, of Indiana, submitted a resolution, directing the Secretary of the Interior to report all railroads to which grants of land had been made, which had not earned such lands by compliance with the terms of the grants within the time specified. Also the number of acres of the earned land claimed by each railroad, and the period when its right expired.

Mr. Edmunds thought at least a part of this information had already been furnished.

Mr. Conkling said there was certain information before the committee, and members of that committee might know the facts, but it was not public.

The resolution was adopted.

The bill abolishing all tolls on the Louisville & Portland Canal after July 1, and authorizing the Secretary of War to draw upon the treasury for the actual expenses of the operation and repair, was passed. This bill had already passed the House, and has since been approved by the President.

#### THE SCRAP HEAP.

##### A Lively Locomotive.

At Lincoln, Neb., the other day, the engineer of No. 23 on the Burlington & Missouri River fired up his machine in the round house and stepped out a moment, leaving the bad creature all alone. She grew ambitious, and swelling with pride and steam, threw open her throttle and started. The two big doors in front were taken right along, but when she reached the end of the little track and came to the turn-table the bridge wasn't in position and No. 23 went down into the pit. Then came an astonished and somewhat chagrined engineer, who with a force of men attempted to pull her upon the track again. Wood-work a little damaged and one pump broken, but that is all. Next time, the engineer will chain down that throttle—or else stay at his post.—*Omaha Republican, May 7.*

##### A Senator's Private Car.

A Washington letter to the *Detroit Free Press* thus discloses:

Last winter when Senator Sharon had to yield to pressure and warm his chair in the United States Senate, he ordered out his Pullman palace car and gave his steward carte blanche to fill its refrigerators and lockers with all the good things that make this life worth living for. Fish, fowl and fruit, game, wines and ice, and every vegetable from the crisp, earth-blanching celery to that plumed knight the tasseled corn, were put away each in its proper place. The Senator and his Secretary, Miss Sharon and a young lady friend who had been invited to accompany her, and four gentlemen acquaintances, guests of the Senator, made up the party. The Virginia & Truckee trains speeded them on to Reno, where their Pullman was coupled to the Atlantic express on the Central Pacific Railroad, and they pursued the morning. The fire glowed in the range, and shone on polished pots, pans and porcelain utensils in the cutest of kitchens as clean as a holystoned deck. In the pantry is a pastry table which, when raised, discloses a zinc sink for washing dishes. Pudding and jelly molds, skewers, steamers and sauce-pans as bright as silver hang on the hooks of the dresser. Stores of delicate china are nestled in the snug closets, crystal and silver-ware crown the oaken buffet in the adjoining room, where there is a table. The car is a miracle of convenience and comfort. It was built at the Pullman Car Shops, in Detroit. It is constructed of rare woods, whose beauty of quality and grain have been brought out by oil, polishing and shellac. There are mirrors and hanging bookshelves. The evening card table is the breakfast and dinner table of the day time. The upholstery is bronze leather, fastened with silver-headed nails. There is hot and cold water in the bath room; the seats are converted into luxurious beds at night, and partitions envelop them with all the privacy of sleeping apartments, produced like magic from nowhere. Even England's Queen does not travel so royally as this silver satrap of the Sierras. Rolling along in his palace, on the sixth day he reaches the end of his journey without fatigue or annoyances of any kind, and the whole party alight as fresh as daisies. The Pullman is stored in the car-house until such time as the Senator shall choose to return to Nevada.

##### The Engineer's Ghost.

Your correspondent fell into the hands of an employé of the Cairo & Vincennes Railroad a day or two ago, and was regaled with one of the most thrilling tales that ever fell on mortal ears. The railroad boys are pretty badly worked up over a reputed ghost at their round-house in Cairo, and some of their stories are really startling.

Eighteen or twenty months ago an engineer named Johnson was run over by a Cairo & Vincennes engine, No. 4, near the roundhouse, and the *habitués* of that vicinity claim that they have frequently seen Johnson's spook, and have had other evidence of his presence on earth. Employés who have met it have interrogated the shadow, thinking it a human being, only so see it vanish through a solid brick wall.

The spirit of the defunct engineer does not confine himself to harmless tricks. Two wipers went down into the fire-pit for the purpose of drawing the fire out of engine No. 4, the same machine which caused Johnson's death. While they were scraping out the fire, the engine suddenly started forward, cutting off their retreat from the hot pit. They yelled piteously for help, but the only answer was mocking laughter. The engine then slowly crawled back to its proper position, and the men, glad of their freedom, rushed out, swearing vengeance on the trickster, but not a soul was in sight.

A colored man undertook to stay by himself in the round-house all night, but no sooner had he become comfortably ensconced, than missiles of every possible nature began to play around his head: Pieces of coal, crow-bars, spikes,

hammers, etc., filled the air, and Mr. Negro vacated, concluding that he was not proof against iron in the form it was being pushed at him.

The latest exploit of the deceased engineer—at least to his ghost is the act accredited—might have put the Cairo & Vincennes Railroad to considerable expense, and sent more than one life into eternity. Last Monday, as the engineer and fireman of a Cairo & Vincennes engine in the Cairo yards were sitting in a building eating their dinner, steam in their engine being shut off, the machine suddenly darted up the line and was out of sight in a jiffy. It went howling over streets and road-crossings, and did not slack speed till it reached Mound City, five miles distant from the starting point, where it came to a dead stand. Those who witnessed the stop, testify that no one jumped off the engine, nor did any one see the occupant of the cab during the flight. Fortunately, however, the engine did not meet with any obstructions on the run, or the consequences would indeed have been terrible.

These are only among the hundreds of incidents related by the railroad boys. There is evidently something amiss, and if the company does not do something to appease the obstreperous defunct, it is not an easy matter to conjecture what the consequences will be. The skeptical "pooh-pooh" the ghost story, but the railroad boys think something is wrong. —*Vincennes Correspondence Cincinnati Enquirer.*

#### Using up the Waste Wood.

Some idea of the waste of lumber in a large repair shop, is given by the following from the Aurora (Ill.) Beacon: "At the present time only old bridge timber is being used at this point to fire up Chicago, Burlington & Quincy engines. Indeed, for a year past, about half the wood consumed here for this purpose has been old bridge timber, ties, fencing, car strippings, etc., and though it takes about double the labor to work it up, a very material saving is thus effected. Cord wood costs from \$2.35 to \$2.40 per cord, and 40 cents additional to prepare it for the engines—while the refuse material above mentioned is worked up at a total cost of 90 cents, and most of it would otherwise prove a total loss, or nearly so."

#### The Reading Fast Engine.

A trial trip was made May 14 with the fast passenger engine recently constructed by the Baldwin Locomotive Works and illustrated in the *Railroad Gazette* of May 7. The run was made from the depot at Ninth and Green streets in Philadelphia, to Jersey City, with four passenger cars, a distance of 89.4 miles, in 98 minutes, and returning with five passenger cars from Jersey City to Ninth and Green streets, Philadelphia, in 100 minutes. No stoppages were made, but speed was slackened between Ninth and Green streets, and Wayne Junction, and at Tabor, Jenkintown, the bridge across the Delaware River, Bound Brook Junction, Elizabeth crossing, Newark Bay draw-bridge and Communipaw draw-bridge. The fastest time made during the run was from Willett to Langhorne, 2.8 miles, in two minutes. Part of the distance between these stations is an ascending grade of 16 ft. per mile.

A time-table of the run both ways is as follows, the time reading down from Philadelphia to Jersey City, and up on the return trip.

	Miles.	Time.	Miles.	Time.
Ninth and Green.....	0.0	11.21	89.4	3.52
Wayne Junction.....	1.3	11.33	88.1	3.43
Tabor Junction.....	6.3	11.33	83.1	3.40
Jenkintown.....	10.1	11.37½	79.3	3.36
Somerton.....	17.6	11.44½	71.8	3.27½
Langhorne.....	23.2	11.49½	66.2	3.22½
Yardley.....	30.1	11.56	59.3	3.15
Trenton Junction.....	42.1	11.59	47.3	3.12
Pennington.....	36.9	12.04	52.5	3.07½
Hopewell.....	42.0	12.08½	47.4	3.03
Skillman.....	45.1	12.11	44.3	3.00½
Vanaken.....	49.1	12.15	40.3	2.55½
Weston.....	55.3	12.20	34.1	2.50
Bound Brook.....	59.2	12.24	30.2	2.45
Dunellen.....	63.5	12.29	25.9	2.41½
Plainfield.....	68.3	12.32	21.1	2.36½
Elizabeth.....	70.9	12.44	12.5	2.26½
Bergen Point.....	82.7	12.51	0.7	...
Jersey City.....	89.4	12.58	0.0	2.11

The Delaware bridge is between Yardley and Trenton Junction; the Newark Bay bridge between Elizabeth and Bergen Point.

#### Fast Time on the Water.

The new steamboat Albany, built for the Day Line between New York and Albany, made a trial trip on the Hudson River May 12. The boat has an iron hull 800 ft. long and 40 ft. beam, and is 75 ft. over the wheel-houses. It is a side-wheel boat, with an engine having a cylinder 78 in. diameter and 144 in. stroke. On the trial trip a run of 16 miles was made in 37½ minutes. In regular service the boat is expected to make 24 miles an hour.

#### British Steel Statistics for 1879.

We are under obligations to Mr. J. S. Jeans, the industrial Secretary of the British Iron Trade Association, for an advance copy of his annual report for 1879, containing statistics of the British iron and steel industries for that year. The report is very full and satisfactory in its references to the commercial aspects of the year's business, but not so complete as we would have been pleased to see it in its record of the production of the year. Only the production of Bessemer and open-hearth steel in 1879 is given in full. Mr. Jeans has, however, done the best that was possible under the embarrassing circumstances which surround him, and the rapidity with which he has compiled and printed his report since the close of the year which it reviews is especially to be noted and commended.

The tables printed by Mr. Jeans on page 37 of his report show that in 1878 there were produced in all Great Britain 807,527 tons of Bessemer steel ingots and 622,300 tons of Bessemer steel rails; and that in 1879 there were produced 834,711 tons of ingots and 520,231 tons of rails. The increase of ingots in 1879 over 1878 was only 27,184 tons, while there was a decrease of rails in 1879 as compared with 1878 of 102,159 tons. The shrinkage in the quantity of rails turned out in 1879 is most remarkable. What became of the large quantity (314,480 tons) of ingots that constitute the difference between the ingot and rail tonnage in the year is not explained. That there can not be any mistake in the figures Mr. Jeans expressly assures us, for he says that returns were made to him "by the whole of the Bessemer steel works in the kingdom, without exception."

The production of Bessemer steel ingots in the United States in 1879 was almost as great as that of Great Britain, being 829,439 gross tons, while our production of Bessemer steel rails in that year, which was 610,682 gross tons, was about 90,000 tons greater than that of Great Britain.

The production of open-hearth steel in Great Britain in 1878 was 176,000 tons, and in 1879 it was 175,000 tons. The production of open-hearth steel in the United States in 1879 was just 50,029 gross tons.—*Journal of the American Iron Association.*

#### A Summary Way of Loading.

As a freight train on the Cincinnati Southern Railroad was passing through a tunnel recently, a rock weighing about 5,000 pounds fell on a car loaded with oak staves, and crushed through the staves to the bottom of the car, and was landed safely at the next depot.





Published Every Friday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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## EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

## PRESERVED CROSS-TIES.

It is now more than forty years since the processes of Bethell, Burnett and Kyan for preserving wood from decay were patented. Since that time, the merits of these and other methods of effecting the same end have been so often and persistently presented to the attention of engineers and railroad managers, and the economy resulting therefrom has been set forth in such glowing colors, that it has seemed as if the persons most interested in this subject were blind to their own interests in not using some of them. Doubtless, though, a great many railroad managers have, like the writer, been in a very confused state of mind regarding the whole subject. There has been the curious anomaly that the inventors have, during all this time, been demonstrating the economy which would result from the use of their processes, while at the same time very few if any cases could be found in this country where this economy had been realized in practice, excepting by those pecuniarily interested in the process employed. But, while this is true, there is also the fact that it is now the very general practice in Europe to treat cross-ties, or sleepers, as they are called there, in some way to prevent decay. We are then brought face to face with the question, if it is profitable there, why does it not pay here; and to this it is proposed to give some consideration.

At the convention of the American Society of Civil Engineers, held in June, 1878, the attention of members was especially called to this subject. This led the Secretary, Mr. Bogart, to prepare a letter containing a series of questions concerning most of the points upon which superior advantages had been claimed for preserved timber. This letter was sent to the engineers of a number of the railroads in Great Britain and Ireland, and the answers were presented in a tabulated form in a paper read Nov. 20, 1878, and published in the January number of Vol. VIII., 1879, of the transactions of that Society. These answers indicated that the sleepers are treated with creosote oil on most of the lines in Great Britain, from which information

was received, and that it is the only method of preservation now in use in the United Kingdom.

The sleepers there are mostly made of Baltic red-wood, and hard woods, such as oak and chestnut, are not used at all there. As the supply of the latter kind of ties is here still sufficient for the demand in the North, the question which must be considered is, whether it is cheaper to use soft-wood ties treated with some preservative process or hard-wood ties untreated. To determine this we must, of course, know how long each kind of tie will last, and it is owing to the vague character of the statistics relating to this subject, that it is so difficult to arrive at any reliable conclusions. None of the European engineers who answered Mr. Bogart's circular seem to have kept any accurate statistics, and their answers seem to have been merely shrewd guesses, approximating more or less closely to the truth, no doubt, but nevertheless open to the very serious errors which are liable to result from such unprecise methods.

Among the questions asked by Mr. Bogart was:

"What is the average life of preserved ties on your road, and, on an average, how many years are gained by the preservation?"

To this Mr. Johnson, Engineer of the Great Northern Railway, answered:

"The average life is about 10 years: 4 years at least are gained by the preservation."

Mr. Lloyd, Engineer of the Great Western Railway, replied:

"18 to 20 years depending very much upon the situation."

Mr. Langley, Engineer of the Great Eastern Railway, said:

"Average life about 10 years; perhaps 10 more if properly creosoted."

Mr. Jacob, Engineer of the London & South-western, stated:

"You might, perhaps, take an average, approximately, of 15 years to sleepers, if properly creosoted."

Mr. Sacre, Engineer of the Manchester, Sheffield & Lincolnshire Railway, thought that:

"The average life of creosoted sleepers will be about 14 years, in fairly favorable circumstances. This might be about two years longer than using timber, under the same circumstances, that was not creosoted."

Mr. Copperthwaite, Engineer of the Northwestern Railway, reported:

"About eleven years; four years are gained by preservation."

Mr. Harrison, Engineer of the same line, testified:

"The average life of a creosoted sleeper is sixteen years on a straight running track, under ordinary traffic, and I consider that about eight years are due to the preservation of the timber by creosote oil."

Mr. Stubbs, of the North Staffordshire line, wrote:

"The average life does not exceed twenty years, of which not more than seven are gained by preservation."

It will be seen from this testimony that the average life given by the different witnesses is respectively 10, 18 to 20, 20, 15, 14, 11, 16 and 20 years. These figures average a little over 15½ years. The gain by creosoting is 4, 10, 2, 4, 8 and 7, which is such a wide difference as practically to have very little value.

Let us see, next, if we can, how long ties of various kinds last in this country. At the road-masters' meeting, held at Niagara in September last, and reported in the *Railroad Gazette* of Oct. 10 and 17 following, this subject was up for discussion. The life of white-oak ties was estimated by the gentlemen named as follows: Mr. Alsop, 8 years; Mr. Hyland, 7 to 8; Mr. Kennedy, 8. The endurance of chestnut ties was estimated as follows: Mr. Hyland, 6 to 7 years; Mr. Kennedy, 6; Mr. Shanks, 7; and with little traffic, Mr. Whitney estimated their life at 20 years. Mr. Fuller estimated the life of hemlock ties at 2½ years; Mr. Latimer at 4; Mr. Whitney at 5, and Mr. Shanks at 3 years. Mr. Huntington said white hemlock would last 11 years; Mr. Stevens said white cedar would last 8 years, and Mr. Shanks gave the life of spruce at 5 years. Mr. Fuller gave the life of sweet-gum and hard-maple when Burnettized at 10 years, and Mr. Wilson said he had seen creosoted ties in England which had been laid 14 years and were as good as when put in.

It is very hard to draw any entirely trustworthy conclusions from these figures. They all contain an element of personal opinion, which often means personal error, and are not deductions from carefully kept statistics. A fair inference from them, though, would be, that the average life of white-oak ties is 7½ years and of creosoted ties 15 years. More definite statistics collected by a committee of the German Railroad Union and reported by it in 1878, including the experience of some twenty railroads with 882,407 ties not preserved and 831,341 preserved ties, gave the following as the average years of service in road for different kinds of wood:

	Not preserved.	Preserved.*
Oak ties	13.6 years.	19.5 years.
Fir "	7.2 "	14 to 16 "
Pine "	5.1 "	8 to 10 "
Beech "	3.0 "	15 to 18 "

\* By impregnating either with creosote or chloride of zinc under great pressure.

The universal ballasting and general good drainage of German roads makes the unpreserved ties more durable there; and the durability of fir and pine vary so greatly in different species that it is not safe to infer that our species would have the same life as the different ones used in Europe.

The price of oak ties, 8 ft. long, 6 in. thick × 7 to 9 in. face, delivered on the Hudson River is, or was a few months ago, 65 cents apiece. The price of North Carolina pine and white hemlock of the same size was 40 cents each, and the cost of creosoting them was 30 cents each. The question may then be narrowed down to one of the single rule of three, thus: If oak ties which cost 65 cents will last 7½ years, how long must creosoted pine or hemlock ties last, which cost 70 cents, to be equally cheap? It is a little more complicated than single rule of three, though, because there is a question of compound interest involved. Without going into any great refinements of calculations, it may be said, that at these prices, if the creosoted ties last 8 years they will be slightly cheaper than the oak ones, which last 7½. At the end of the 8 years the cost of each tie will be very nearly \$1.10, and therefore the cost per year will have been 13½ cents each. It consequently follows that each year's service that the creosoted tie gives over and above 8 years is worth 13½ cents clear, which, with interest added for the ninth year, would amount to 14.3 cents. Therefore, if the creosoted ties last 9 years, and if they are spaced two feet apart, they would be worth to a railroad company  $2,640 \times 14.3 = \$377.52$  per mile, and an equal amount each year thereafter, with interest added.

The question then comes up—will creosoted ties last eight years and over? In answer to this, reference may be made to the testimony of the British engineers. It will be seen that the lowest estimate of any of these is 10 years, and the highest 20. But it will be said it is not merely the resistance to decay that must be considered, as the life of a tie is in great part limited to its capacity to resist the mechanical abrasion of the rail and the cutting or crushing from this cause. The experience of English engineers is of very little value as a criterion of the endurance of prepared ties on an American road, because in England rails are generally laid on chairs, the bearing surface of which is considerably greater than that of our flat-footed rails.

The paper by Mr. Bogart, already referred to, contains among other information engravings of the chairs used on a number of lines, the size of the base of which is about 6 × 15 in. These are placed lengthwise to the sleepers, so that they bear over the whole length of the chair, and therefore their bearing surface is about 90 square inches. The width of the base of 60-lb. rails used here is usually 4¼ in., so that on a tie with 8-in. face the bearing surface would be 34 in., or a little over a third of that which the English chairs have. The testimony given by the British engineers with reference to this point is a little conflicting. Some of them say that with a properly designed chair, having enough bearing-surface, the ties are not cut, while others say "the cutting of the sleepers by the chairs is a general complaint" which preserving the timber will not prevent. Some of them said that creosoting does not prevent this, while others gave testimony that it does. There can be no doubt, though, that in this country, where the rails have so much less bearing-surface on the ties than the chairs have which are used abroad, the evil will be much greater than there, so that probably the whole question of the economy of creosoted soft ties here will turn on that of their capacity to resist the abrasion or cutting of the rails.

It is claimed by some that the cutting of ties by the rails is in part a process of decay, and that if this did not take place they would not be abraded by the rails. It is, of course, true, too, that abrasion is proportional to the traffic over a line, and that, therefore, while ties might be destroyed by abrasion on a road having many trains on it, they would probably fail from decay on another road which has little traffic. If this hypothesis is correct, the somewhat anomalous conclusion follows, that it might be profitable to creosote ties on lines with a light business, whereas on those with many and heavy trains it may not be.

The German report referred to emphasizes the value of the preserving process to roads with a thin traffic, like most of our roads in the South, many in the West, and not a few in all parts of the country. This is because on such roads the renewals required by wear are fewer, and where decay is stopped the main cause of destruction is avoided. A striking illustration of this is the experience of a road from Rheine to Emden, which, having a light traffic and impregnated fir ties laid in fine permeable gravel, out of 167,403 needed to renew but 0.8 per cent. within five years, 1.05 per cent.



within 10 years, 3.55 per cent. within 15 years, 26.87 per cent. within 20 years, and 37.28 per cent. within 22 years, thus leaving *five-eighths* of these soft-wood ties still in the road after 22 years' service.

The testimony which is now needed most is that which will establish clearly the capacity of prepared ties to resist cutting. If they do not fail from this cause, it seems plain that the process will add another very important economy to the operation of railroads in this country. On the main line of the Central Railroad of New Jersey about two miles of track are laid near Bound Brook with creosoted ties made of Virginia pine, a soft timber, which, without treatment, would not last in the ground over two summers. These have now been laid about four years, and on a careful examination show but little indications of cutting—at least the latter is so very little as not to be of any detriment thus far—and there is no indication whatever of decay. There is good reason for believing that these ties will give good service for three or four years longer without turning, and that after that, they will last at least four years longer, if they are laid with the bottom side up. This would give a life of twelve years, the value of which has already been estimated.

The question of the economy of treating hard-wood ties will naturally suggest itself. The chief objection to doing this, it is believed, is the fact that it is difficult to induce railroad managers to incur an expense of nearly 50 per cent. of that of the ties, the profit from which can only be realized eight or ten years hence.

#### THE WINTER GRAIN MOVEMENT.

The period during which lake shipments were suspended this year was from about Dec. 1 to April 3, and was included in our last review of the grain movement, five weeks ago. The period during which the arrivals at the seaboard in canal-boats was suspended this year lasted about a month longer, and last year till the last week in May. Thus the movement for the five months ending May 1 which we give below can be considered the "winter" movement only so far as Atlantic receipts are concerned. In none of the years compared, we believe, were there any canal receipts in these five months, except the last arrivals of the season, which enter New York usually the first week in December, and some few boat-loads from way points on the canals that may get down before May when the canal is opened as early as the 20th of April, as it was this year.

And first, for the whole grain movement during this period, the receipts and shipments of grain of all kinds at the reporting Northwestern markets, St. Louis, Peoria, Chicago, Milwaukee, Detroit, Toledo and Cleveland (Duluth reports no business and probably has none at that time of the year), and the receipts at the Atlantic ports have been, for the five months ending May 1, for seven years:

Year.	Northwestern— Receipts.	Shipments.	Atlantic receipts.
1874.....	54,235,578	29,499,348	41,027,047
1875.....	35,930,337	18,005,849	23,080,804
1876.....	48,024,441	30,797,372	39,229,065
1877.....	43,358,882	26,000,317	40,903,919
1878.....	61,097,698	44,475,196	72,615,901
1879.....	64,989,922	40,377,517	78,692,236
1880.....	82,126,408	50,218,711	84,000,064

The business of the five months this year has thus been the largest ever known. Compared with last year, there is an increase of 28 per cent. in Northwestern receipts, of nearly 40 per cent. in Northwestern shipments, and of 6½ per cent. in Atlantic receipts.

The effect of the higher and much better maintained rates this year might well not appear in the receipts of the Northwestern markets, but very decidedly in their shipments and in the receipts of Atlantic ports. It would seem that if the trade found the rail rates too high it would collect the grain at the lake ports and hold it there to be forwarded when navigation opened. But when navigation opened, April 3, more grain had been shipped during the four months since the lakes closed than in any previous winter. However, it is true that, compared with 1879, the receipts of these markets increased 13,000,000 and their shipments but 5,300,000 bushels. Further, the receipts of Atlantic ports were also larger this year.

As the period of closed lake navigation was nearly a month longer last year, however, the rail shipments for this period were larger last year, but after all not much larger—36,300,000 bushels in eighteen weeks of 1879-80, against 40,400,000 in twenty-two weeks of 1878-79. Certainly this business has been very satisfactory this year, and has fully justified the rates that were made and maintained; though the effect would doubtless have been different had the prices of grain been low instead of high. Rates were based on a Chicago-New York rate of 40 cents per 100 lbs. until March 1; of 35 cents from March 1 till April 14, and of 30 cents since.

The receipts of grain of all kinds at the seven Atlan-

tic ports for the five months ending May 1 have been, in bushels, for the past four years:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	12,921,804	29,653,298	31,525,074	31,989,686
Boston.....	4,795,190	5,752,370	7,181,636	7,870,416
Portland.....	706,473	1,436,121	1,050,391	1,727,729
Montreal.....	123,965	71,969	102,430	313,816
Philadelphia.....	7,389,150	14,131,980	14,936,920	14,136,810
Baltimore.....	12,163,704	15,165,200	17,984,850	18,173,717
New Orleans.....	2,991,604	6,395,563	5,961,734	9,807,890

Total.....41,131,389 72,616,301 78,743,036 84,000,064

There was thus an increase of 5,257,028 bushels, or 6½ per cent., in the aggregate receipts of the seven ports. At all ports, except Philadelphia, there was some increase; but nowhere, except at New Orleans, was it large in amount. There it was 3,846,000 bushels, or 64½ per cent. Philadelphia and Baltimore together received 611,000 bushels less than last year; New York, 444,000 bushels more.

The percentage of the total receipts arriving at each port each year has been for this period:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	31.4	40.8	40.0	38.1
Boston.....	11.7	7.9	9.1	9.4
Portland.....	1.9	2.0	1.3	2.0
Montreal.....	0.3	0.1	0.1	0.4
Philadelphia.....	17.8	19.5	19.0	16.8
Baltimore.....	29.6	20.9	22.9	21.6
New Orleans.....	7.3	8.8	7.6	11.7

Total.....100.0 100.0 100.0 100.0

Compared with last year, New Orleans and the three most northern ports gain, but each of the leading ports loses—Philadelphia most, New York next, and Baltimore least. The business of New Orleans should have been greatly stimulated by the maintenance of comparatively high rates to the North Atlantic ports; how far it was so stimulated we can judge better by the result of its competition with the cheap lake and canal route this season.

Comparing the percentages of New York with those of Philadelphia and Baltimore taken together we have:

	1876-77.	1877-78.	1878-79.	1879-80.
New York.....	31.4	40.8	40.0	38.1
Philadelphia and Baltimore.....	47.4	40.4	41.9	38.4

The three cities.....78.8 81.2 81.9 76.5

Comparing New York and Boston taken together with Philadelphia and Baltimore taken together, we have:

	1876-77.	1877-78.	1878-79.	1879-80.
New York and Boston.....	43.1	48.7	49.1	47.5
Philadelphia and Baltimore.....	47.4	40.4	41.9	38.4

The four cities.....90.5 89.1 91.0 85.9

The receipts of the two northern cities were exceeded by those of the two southern ones in 1877, but they exceeded the latter by 8.3 per cent. of the whole in 1878, by 7.2 in 1877, and by 9.1 per cent. this year. Both have maintained their position, as compared with Philadelphia and Baltimore, extremely well, but that Boston has done so well is probably due partly to the fact that reductions in the regular rates were made to it and not to the other cities (except Portland) by one of the routes. The chief changes in the proportions of the different places are due to the increase at New Orleans.

Leaving out New Orleans entirely, the proportion of the remainder of the receipts arriving at each port was:

	1877.	1878.	1879.	1880.
New York.....	33.9	44.7	43.3	43.1
Boston.....	12.6	8.7	9.8	10.6
Portland.....	2.1	2.2	1.4	2.3
Montreal.....	0.3	0.1	0.1	0.5
Philadelphia.....	19.2	21.4	20.6	19.0
Baltimore.....	31.9	22.9	24.8	24.5

Total.....100.0 100.0 100.0 100.0

New York's and Baltimore's proportions are therefore nearly the same this year as last, but Philadelphia has a smaller proportion than in either of the three previous years. The differences altogether, however, when New Orleans is left out, are comparatively trifling, and only such as accidental circumstances may easily account for.

Before leaving the subject we will call attention to the stimulation of the receipts of grain at lake ports, and especially at Chicago, by the opening of navigation; perhaps it would be more exact to say by the opening of navigation while rail rates are maintained at something more than cost. Roads which carry directly to the East divert traffic from roads that carry to the lakes when the rail rates are about as low as the lake and canal rates, as they have been much of the time for two seasons before this, because then there is little or no advantage in shipping by water. The effect of the opening may be traced to some extent in the percentages of the receipts at the several Northwestern markets, in successive weeks. These are given below for thirteen weeks.

Week ending	Chicago.	Milwaukee.	Toledo.	Detroit.	Cleveland.	St. Louis.	Peoria.
Feb. 14.....	33.2	6.8	15.8	2.1	4.3	20.3	11.5
" 21.....	34.0	7.8	13.6	3.2	5.5	20.3	10.6
" 28.....	36.5	7.3	11.7	1.7	5.1	29.5	8.2
Mar. 6.....	42.6	6.2	9.4	1.4	1.3	32.1	7.0
" 13.....	45.3	5.7	8.9	1.5	1.1	27.6	9.9
" 20.....	46.2	6.7	9.0	3.0	0.9	18.6	15.6
" 27.....	46.8	5.2	14.8	4.8	0.4	17.7	10.3
Apr. 3.....	36.6	3.4	21.3	5.7	2.8	22.1	8.1
" 10.....	30.1	4.0	24.0	4.6	1.8	28.1	7.4
" 17.....	29.5	3.8	24.7	5.1	1.7	22.2	13.0
" 24.....	32.5	4.0	24.1	4.2	2.2	17.2	15.0
May 1.....	46.7	6.9	17.1	3.0	1.8	13.0	11.5
" 8.....	54.8	7.0	14.1	1.4	1.7	12.4	8.5

The Toledo shipments seem to contradict this effect but there is never much advantage in shipping from Toledo by lake; though the distance by lake to Buffalo is only about one-quarter the distance from Chicago, the lake rate is usually about two-thirds as high, and the two transfers must be paid for in both cases alike. Consequently not a large proportion of the Toledo shipments are by lake, and the chief Toledo railroad is one of the greatest competitors of the railroads which lead to Chicago from the south and southwest.

It seems from the above that since navigation opened Chicago has been getting a larger proportion of the receipts and St. Louis and latterly Toledo a much smaller one. Lake and canal rates recently have risen considerably, and the reduction of the difference between rail and water rates thus caused will doubtless be favorable to rail shipments.

#### Imprisoning the Passengers.

Boston papers narrate that the appeal taken by McAllister, the Harvard student, who sued the Old Colony Railroad Company for refusing to let him go ashore at Newport, when he held a through ticket, has been decided in his favor. Such a decision was, we think, to have been expected. The circumstances were substantially these: Although, on account of rivalry of other through lines, the price of a limited through ticket from Boston to New York is only one dollar, yet the fare from Boston to Newport is placed at \$1.60. This is one of the common results of competition. McAllister, intending to go to Newport only, bought a through ticket because it cost less than the way fare. When the boat arrived at Newport he offered to surrender his through ticket and essayed to leave; but the officers of the boat would not permit him to do so. Their position was, that as he was ticketed to New York, to New York he must go, unless he would pay the additional sixty cents for the privilege of shortening his trip. For this detention he brought an action. It was ruled in favor of the company on the trial; but the appeal taken by the passenger has resulted in a judgment in his favor for \$75 and costs, or about \$200 in all.

The appellate court holds that a railroad company is not vested with authority to imprison its passengers on board a steamboat forming part of the route, and carry them beyond a regular passenger landing at which they wish to leave.

Subordinate officers are easily misled, in reference to a case of this sort, by the resemblance between putting a non-paying passenger off the company's conveyance when he wishes to ride, and detaining him when he wishes to stop. The rule has become well settled that a railroad company may put a passenger off the train for non-payment of fare or gross and persistent breach of reasonable regulations. This appears like a summary remedy given to the companies for collection of fares. If this were its nature it would easily be extended to justify detaining a passenger for non-payment. Carriers have a lien on merchandise or baggage; why not one upon passengers? The law does not accord one, and there is no basis for the claim in any supposed analogy found in the right to put a passenger off. That right rests upon the principle that no obligation to carry exists when payment of fare is refused. The obligation to carry a passenger may rest upon either or both of two grounds; the duty of the corporation to carry any member of the public claiming to travel, or the contract with the individual passenger that he may ride. Both the duty and the contract rest upon the condition that the lawful fare is paid and the lawful rules are obeyed. If either condition is broken, the duty to carry terminates. And the courts have held that if the refusal to pay fare, or the violation of the rules, occurs after the journey has commenced, the effect is just the same as if it were known beforehand. The company is no longer bound to carry the recalcitrant passenger; and, in a temperate, kindly manner, he may be put off. This is not a peculiar right accorded to railroad companies. It is the general right of persons rendering services to stop them, if, when the compensation becomes due, it is not paid. The rule is simply a refusal to deny to railroad companies the right to stop work for one who will not pay wages, which is accorded to almost every employé. There has been some difficulty and hesitation in applying this principle to railroads, because the putting a passenger out of a public conveyance midway in a long journey involves some elements of hardship which are peculiar. Notwithstanding these, the right is established. Yet the question has always been, not whether railroad companies might have a peculiar remedy for collecting fares, but whether they might do as persons in ordinary employment do when they are not paid, viz., stop the service.

To assume to hold a passenger in duress after the



journey is over, because he has not paid the proper fare or does not surrender the proper ticket, is a very different claim. It is, in effect, imprisonment for debt. Before the journey is commenced a company may take almost any reasonable precautions to prevent non-paying persons from taking passage: and non-paying passengers detected on the line may be put off. But, after the journey is completed, after the transportation has been performed, the traveler becomes simply a debtor to the corporation for the fare. The company has the same right to collect the demand by suit in the courts that is given to other creditors. But it is not the general doctrine of the law that persons who have become indebted for petty sums, even by trick and fraud, may be kept in durance by their creditors until they will pay the money. There is no good ground, in principle or in the decisions of the courts, for supposing that carrying companies have an unusual or extraordinary privilege of this character. As in respect to the right to suspend service for which payment is withheld, so in regard to enforcing payment after the service has been rendered, they stand on the same ground with persons in ordinary employments.

The principle was well explained in a suit against the Narragansett Steamship Company, decided in Massachusetts in 1873. Standish bought, at the Boston depot, a ticket for Philadelphia via Fall River and New York. As he showed it to the clerk of the boat and the servant in the cabin to obtain his berth, there was no disputing that he had paid fare and taken a ticket. But on arrival at the boat in the morning, he could not find the ticket to surrender it. The collecting officer of the boat refused to allow him to leave with the other passengers. He explained the circumstances, but the collector insisted that fare must be paid from Fall River to New York or the boat would carry the passenger back to Fall River. Standish endeavored to go on shore notwithstanding, but the hands forcibly prevented him. He then paid the fare under protest, and brought suit for assault and battery and false imprisonment. The judges said that the right of the railroad company to detain the passenger was a very limited one. To detain him as a means of compelling him to pay fare was unlawful. As the rule of the company required the ticket to be surrendered on the arrival of the boat, and this appeared to be reasonable, the collecting agents were justified in detaining a ticketless passenger for a brief, reasonable time to ascertain the truth of his story of having lost his ticket. If the jury found that the agents detained the passenger to compel him to pay, or for more than a reasonable time to investigate, he was entitled to damages; but not so if the detention was only sufficient to ascertain the truth. The jury awarded Standish \$50; and the Supreme Court said that this was a lawful verdict, although quite large enough under the circumstances.

It does not answer the claim of the complaining passenger in these cases to say that if the detention is not lawful, it is not within the agency of the company's servants, but is misconduct outside of their employment, for which the company is not liable. There is such a principle applicable to ordinary cases of agency, but the liability of a carrier toward a passenger for acts of violence by an employé is more stringent than that of an ordinary master for acts of his servants. Both the contract and the public duty of a railroad company require the delivery of the passenger at the proper station, safe and sound, and free to pursue his further journey; and they involve an obligation that employes shall use all reasonable efforts to this end. Neither contract nor duty is performed if the employes, without warrant of law, detain the passenger as a prisoner in a station, or carry him an unwilling captive beyond his landing. Nor does it answer such claim to say, in a case like *McAllister's*, that the contract is for a through passage. On the part of the company, there is an obligation to afford a through passage. But it cannot be said that the passenger is under a contract-obligation to make the entire journey. He holds the ticket as an option, license or privilege. If the pressure of competition necessitates reducing through fares below way rates, the collection must be secured by other means than carrying the passenger against his will beyond the regular stopping place at which he wishes to terminate his journey. And, generally speaking, regulations of the companies which contemplate imprisoning the passenger as the means by which they are to be enforced may be regarded as ill-advised, and likely to involve the corporation in suits not admitting of easy defense.

#### Foreign Railroad Notes.

It is proposed to introduce a uniform standard time for the whole German Empire, which, however, is to be used for all purposes, and not alone for railroad time-tables. If this is done, it is suggested that the regular hours for begin-

ning a day's work, opening and dismissing school, church services and the like be changed to the nearest quarter hour of the standard time; that is, if where work begins at 7 o'clock by the present local time the standard time should be 12 minutes fast, the time of beginning work would be fixed at 7:15, etc. In the discussion of this question it is made to appear that most European countries have already adopted a standard time. Austria uses the time of Prague, which is 19 minutes fast for the extreme west and 20 minutes slow for the extreme east of the kingdom; Hungary has adopted the time of Pesth, which is 19 minutes different from local time for the west and 34 minutes for the east of the country. For Sweden and Norway, the time of a meridian about half way between Stockholm and Gothenburg is adopted. Belgium, Holland, Switzerland and Denmark use the times of their respective capitals. The meridian of Greenwich serves for England, Scotland and Wales, and that of a meridian 6° 15' further west for Ireland. Paris time rules in France: it is 28 minutes from the local time of the extreme west and 24 from that of the extreme east of the national territory. Italy goes by the time of Rome, which is 23 and 24 minutes respectively from the extreme local times.

Prof. E. Pfüger, of Berne, Switzerland, has introduced a new test for color-blindness. This consists of sheets of colored paper on which are drawn lines or figures in black or gray, or figures of the same degree of luminosity as the color of the paper itself. Those color-blind as to the color of any sheet will not see what is drawn on it at all when they look at it through gauze, it being all one uniform gray to them. Pfüger publishes sheets of this kind in which the gray figures are letters or words.

Prof. C. Bondi, of Trieste, recently exhibited before the Austrian Railroad Club a method invented by him by which a railroad train while running is kept in telegraphic connection with the stations, and, for that matter, with the rest of the world. The models worked perfectly, and the numerous railroad officers who witnessed it were anxious that a trial should be made with actual trains on a railroad. If practical, it is evident that this might have a great effect on safety in operation.

In Austria, as almost everywhere else, there have been great complaints of rebates and discriminations. Formerly these rebates were given secretly and for the same reasons that they are everywhere where there is competition. In some cases the firms which had contracts for rebates became virtually forwarding agents, shipping little or nothing for themselves, but taking other people's freight. This went so far that they employed agents who gave the shippers certain commissions on the freight charges for shipping on the firm's way-bills, and even employed the railroad's own agents for this purpose; and in some cases the agents of such firms even secured free passes from the railroad, which thus helped to pay the men employed for the purpose of reducing its income. This condition of things having become insufferable, and public opinion being loud against it, a change was made which secures publicity, but in other respects seems even more injurious to the equality of shippers. By this new method, which is now in operation, a rebate of a certain percentage of the freight is made for a certain quantity shipped, and this percentage increases with the quantity shipped, so that the largest shippers get a rebate of as much as 15 per cent. Now, this amount in the case of certain coarse freights hauled long distances may easily be equal to the difference between a profit or a loss on the freight when sold at its destination. It is claimed that this policy is giving a monopoly of certain kinds of business to the large shippers, and driving the small traders out of the market. It is more injurious to these latter than the old system, because it is applied everywhere alike, instead of being limited to cases where competition required it, and where, consequently, the rates of transportation actually paid by the freight were very little changed by the rebate, the effect of which was to enable a route which otherwise would have none of that traffic to get a share of it at the rates formerly paid by a more favorable route.

An Austrian journal notes the manner in which the cultivation of the right of way has been prosecuted on the Wurtemberg State Railroad. It takes charge of the whole business itself, instead of giving it out to the trackmen, putting it under the supervision of a professional forester, who has subordinate to him a "cultivator," who is usually a skillful gardener, for every 30 to 45 miles of road. This practice has been followed for ten years. There are 815 miles of road, and about 11,000 acres of land, two-thirds of which are occupied by the slopes of excavations and embankments; while the surface available for cultivation is about 6,000 acres (including parts of the slopes). The first aim was to consolidate the earth. For this purpose clover-like forage plants (lucerne and sainfoin) were grown on the better land, and the acacia, on sterile, stony ground exposed to a burning heat. Where the way had been cleared through woods, oak saplings were cultivated. Special care was taken with growing hedge fences, chiefly of white thorn, and snow fences, for which pines and firs were preferred. The chief care, however, has been in growing fruit trees. Some 70,000 fruit trees will be grown, and 25 to 50 acres cultivated as vineyards. The ornamental and vegetable gardens at the stations and at the trackmen's houses are also under the supervision of the "cultivator." The average cost of getting a mile of road stocked with trees, grass, etc., and put under cultivation, has been, where the ground was rough and the work difficult, about \$600. About 30 miles a year were brought under cultivation. No reports of the results of this experiment are given. It is probably too early as yet for most of the orchards to be bearing much, but their value can very well be estimated by a comparison with other orchards in the vicinity. The appearance of

many lines, however, would be vastly improved by such cultivation.

A German horticultural periodical also proposes that the right of way of railroads be devoted to fruit gardens, for which it recommends chiefly dwarf trees and bushes for small fruits. It says that fruit trees are grown in place of hedges for long distances along some of the Belgian roads.

At the close of the Russian war a vast quantity of rolling-stock and railroad materials procured especially for use in the campaign was gathered at Ungbeni, on the Roumanian frontier, where it lay without shelter for two years. The whole lot was bought for the Roumanian state railroads for about 30 per cent. of its original cost. There were 66 locomotives, which brought an average of \$6,695 a piece. Freight cars went at \$320 to \$500; flat cars at \$120 to \$320.

Russia has been imitating New York by having a commission to investigate and report upon railroads, and especially rates and discriminations. All the irregularities and abuses that were ever charged anywhere seem to have been discovered by this commission. It finds, however, some of the greater discriminations justified by the competition of boats on the Volga. Among the rates named we see mentioned 1.9 and 2.3 cents per ton per mile for grain on a road near Moscow. Another Moscow road which serves as an outlet to three roads to the Volga pays 30 per cent. dividends. On the other hand the three Volga roads do not earn their dividends, but have them made up by the government, which has guaranteed them 5 per cent. Those who wish reports of this commission are respectfully referred to Prince A. Tschtscherbato, Moscow.

The September number of the sheet published by the Russian Ministry of Transportation stated that there were 121,500 employes on the Russian railroads, receiving above 34,000,000 roubles (about \$25,000,000) yearly. The pay of a "Technical Director of Operation," who may be classed as equivalent to a superintendent of an American road, averages \$6,400. The highest salary paid any of them is \$18,750.

The reports of the French railroads show an increase of 384 miles of road during the year, making a total of 14,147 miles in operation in the country at the close of the year. Some of the results of operation for the two last years are as follows:

	1879.	1878.	Inc. or Dec.	P. c.
Average mileage worked.....	13,898	13,472	I.	426 3.2
Gross earnings.....	\$182,746,400	\$181,459,200	I.	\$1,287,200 0.7
Average earnings per mile.....	13,147	13,470	D.	323 2.4

The taxes on railroad traffic imposed by the government and collected and paid over to it by the railroads amounted to \$18,318,500 in 1878.

In France the administration, which has been working a small system of railroads of its own for about a year, has signed an agreement with the Orleans Company for the purchase or lease of a part of its system; but a commission appointed by Parliament has reported against this partial purchase and in favor of the government's buying the whole system of the Orleans Company.

It is estimated that there will be a production of about 2,250,000 tons of steel rails in Europe in 1880, which would suffice to lay 25,568 miles of track with 56-lb. rails. Of this production, 775,000 tons are credited to England, more than 400,000 to Germany, 275,000 to France, 250,000 to Austria-Hungary, 150,000 to Belgium, and 150,000 to Sweden and Russia.

The International Sleeping-Car Company, of Belgium, which runs the Mann sleeping-cars on various European lines, does not appear to do a very heavy business. Its gross earnings were \$170,237 in 1879, against \$149,083 in 1878; its expenses, \$95,200, against \$79,958, and its profits \$75,037, against \$69,125.

In the whole German Empire, on the 1st of January of this year, there were 20,474 miles of railroad in operation as common carriers (besides some 750 miles of private roads in mines, iron works, etc.), of which 6,070 miles were double-track roads. Of the whole mileage, 1,592 miles were considered "secondary" roads, and of these 80½ miles were of narrow-gauge. At that time, 12,929 miles, or 63 per cent. of the whole, were worked by governments, but since that time the number and proportion have been largely increased.

At the beginning of 1879 there were 5,068 miles of railroad in operation in Italy, and 352 miles under construction. Besides these Italy has a great number of street railroads, many of which are worked by locomotives—in January of 1879 220 miles were so worked and only 103 miles worked with horses. During 1879 74 miles were added to the regular steam railroads, making the total at the beginning of this year 5,142 miles. The government worked 2,204 miles, all in one system.

In 1878, the average rates received on the Prussian railroads were 1.40 cents per passenger per mile, and 1.553 cents per ton per mile. The latter is 55 per cent. more than the average receipt on the New York roads for the same year: the former about 35 per cent. less. The cost of motive power per mile of revenue trains (including fuel and wages as well as repairs and stores) was 30.3 cents per mile, 5.92 cents of which were for fuel. The average locomotive performance (not including switching) was 11,158 miles. Passenger cars ran an average of 20,245 miles and freight cars an average of 9,050 miles each during the year. The average number of passengers was 4.5 per axle (for most passenger-cars 9 per car), which was 23.3 per cent. of the capacity of the cars. The average net load of freight cars was 2.15 tons per axle, or about 4.3 tons per car (as nearly all have but two axles). And of the cars that were loaded the average



load was 7.2 tons, which was 71 per cent. of their capacity; but of cars running loaded and unloaded the average load was but 42.2 per cent. of their capacity. The roads employed altogether 179,203 men, which is an average of 15.3 per mile of road—more than twice as many as our roads employ. With regard to accidents, 1,162 persons were injured and 375 killed on these roads in 1878, but only 46 of the injured and 12 of the killed were passengers, while 635 of the injured and 162 of the killed were employés.

The Prussian state railroad system having been considerably enlarged by the acquisition of private railroads, a new organization has been adopted. By this a number of independent "directions" are appointed at leading railroad centres, reporting to the Minister of Public Works, and each having usually several railroads under its charge. Each direction has under it several "bureaux of operation," each with its head (called Director), which have charge of the working of certain specified lines. For instance, there is a "Royal Direction" at Berlin (President, Pape), which has under it six operating bureaux (Betriebsämter). Three of these bureaux are at Berlin. One works the line from Berlin to Sommerfeld, and also the Berlin Girdle Railroad; another the line from Berlin to Stralsund; a third the Berlin & Dresden Railroad. But the Royal Direction at Bromberg also has an operating bureau at Berlin. The field of a bureau seems to be somewhat more extended than a "division" of one of our great railroads, and to include usually a line or lines which are to a certain extent complete in themselves, as indeed our "divisions" sometimes are. A "direction" has something of the field of one of our larger railroads (but not the largest); but it is usually made up, not of a number of connecting roads in one long line, but rather of a number of adjoining roads, covering a somewhat compact territory.

There is, we believe, no change in the principle of this organization, which has always been considered in Europe as a remarkably decentralized one for a state system, leaving a great deal to the discretion of the managements of the separate lines.

The Russian railroad investigating committee reports that at the beginning of 1879 the Russian railroads had 5,074 locomotives and 106,190 cars. Great complaints have been made of lack of rolling stock while traffic is active, but the commission says that this is due rather to imperfect utilization of the stock than to an insufficient quantity. It often happens that empty cars stand on side-tracks so long that the wheels are overgrown with grass, while at other stations on the same road there is great complaint of a lack of cars.

The Odessa Railroad within two years received from the Russian government for the transportation of troops and their supplies nearly \$7,500,000.

Russian railroad companies have been accustomed at times to vote a certain sum to be divided among their employés in addition to their regular salaries. Some complaint has been made that these sums were not fairly divided, and a road is cited which voted 30,000 roubles (\$22,500) for 1879. Of this the Superintendent, whose salary was 15,000 roubles, got 5,000, or an addition of 33½ per cent. to his pay; the Chief Engineer received 2,000 roubles, or an addition of 25 per cent. to his salary of 8,000 roubles; and so on, till the telegraphers and clerks on salaries of 200 to 600 roubles got the sum of three roubles (\$2.25) apiece. "To him that bath," etc.

#### A Loud Call For Better Brakes.

The prophecy published in our issue of April 30 that the New York Central Railroad will sooner or later have a more or less serious accident, which would be prevented if its passenger trains were equipped with efficient continuous brakes, hardly had time to reach our readers before it was fulfilled by the wrecking of a passenger train, which ran off the track at an open switch at St. Johnsville May 10. The accounts of this accident which have reached us are not very clear in their description of the circumstances which caused it. The *Utica Herald*, in its report, says:

"Just as Engineer Rickard was approaching St. Johnsville Station on track No. 2, and passing the coal dumps, he found that his train had mounted the patent 'safety switch' (said to be a Wharton switch), a double apparatus intended to prevent accidents if all other things worked right. This switch is put into a branch that leads over to track No. 1 on the south side. Had the other end of the branch been turned right for No. 1 track, there was a possible chance that a train going at the rate of forty miles an hour might be safely shunted on to another track by a short branch, but—it was not turned right, but locked open! When Engineer Rickard discovered the misplaced safety-switch, he shut off steam, reversed, pulled his whistle, and ordered Fireman Hughes to apply the patent brakes, which was done at once. The train passed on to track No. 1, and from that on to the branch which leads toward the round-house, the end of which was open."

The fireman is reported to have said "that the position of the safety-switch could not be seen until they got on to it. Then the engineer shut off, whistled and reversed, telling him to pull the patent brakes, which he did." The distance from the misplaced switch to the open one is not stated, but from the above account it apparently was sufficiently great to give time to tell the fireman to apply the patent brakes and for him to obey the order. These brakes were of the old Creamer pattern, and consist of a strong coiled spring on each car, which is wound up before starting, and which can be released by a pawl connected to the bell-cord. The tension of the spring is then exerted on the brake-shaft, and the brakes are thus applied. Before the latter can be done the slack of the bell-cords, through the whole train, must be drawn up on the engine. This is from ten to fifteen feet. The time consumed in giving and receiving directions and pulling the bell-cord is considerable, if the train is running forty miles an hour,

with death and destruction within a few hundred feet. At any rate, in the case under consideration, it was so great that the train was not saved from total wreck, and it was only by the merest chance that there was not a terrible loss of life. If the train had been equipped with some one of the more efficient forms of continuous brakes it would not have been necessary to give or receive directions to apply them, as the apparatus is directly under the control of the engineer, and no time would have been consumed in pulling several yards of bell-cord. The speed of the train could, therefore, have been checked much earlier, and in all probability the injury to it would have been much less. As it was, half a dozen persons received trifling injuries, and one poor fellow will probably be maimed for life.

In the absence of any evidence, it is of course impossible to give the distance from the point where the engineer discovered the switch was wrong to that where it ran off. Report says, though, that it was about two train-lengths, or about 1,100 feet. With the most efficient form of brakes, the train could readily have been brought to a full stop in this distance.

Commenting on this accident the *Syracuse Herald* says:

"If the Central Railway would vaunt itself a little less on some of its noteworthy features, and show a little more enterprise in guarding its patrons against injury to life and limb, it would deserve better of the public. It employs, we believe, neither of the modern safety-brakes, but trusts entirely to the old-fashioned kind. On one train only it was forced to adopt the freshest appliances, because Mr. Vanderbilt was mercilessly assailed for the lack of them by sundry rich and influential gentlemen who were in the habit of passing over the road. A disaster which occurred some time ago on the Central-Hudson line could have been averted, according to the engineer's own statement, if a patent brake had been within his reach; and yesterday's accident, if it is safe to say, could have been mitigated in severity, even if not escaped altogether, had such means been at command. Engineer Rickard has the reputation of being one of the best men in the service, and, with his cool head and strong arm, could have brought the train to a stand-still very quickly, if all that had been required was a pull at an air-brake handle. Four tracks are something for a railway to pride itself on, but precautions in the interest of the traveling public would be worth more as a rule."

This language is very mild. The fact is, the managers of the New York Central are exposing the lives of hundreds of people daily to risk of accident which it is in their power to avert, and the only reason for doing this apparent to the public is to save the expense of providing the appliances which are almost universally in use on all other first-class railroads. If the certainty that sooner or later there will be some terrible sacrifice of life and limb on the road referred to, which efficient continuous brakes would avert, is considered, the question whether it is cheaper to kill and maim a greater or lesser number of persons than it would be to provide the appliances to prevent such a catastrophe has a very ugly look if stated plainly, and in that form it must present itself to the managers of this railroad unless they are woefully ignorant of the effectiveness of the modern brake appliances.

#### Profits of the New York Elevated Railroads.

The Manhattan Railway Company, which leases and works both the New York Elevated and the Metropolitan Elevated railroads, reports its earnings and expenses for the six months of the fiscal year ending with March, as follows:

	Earnings.	Expenses.	Net earnings.
New York Elevated.....	\$1,332,558	\$689,141	\$640,427
Metropolitan Elevated.....	921,608	505,995	415,613
Total.....	\$2,254,236	\$1,195,136	\$1,059,100

The rental for the half-year amounted to \$1,202,500—\$552,500 for interest and \$650,000 for guaranteed dividends. Thus the rental exceeded the net earnings by \$143,400. During this period the Second avenue line of the Metropolitan road was open but one month to Sixty-second street, or about four miles. For this month its earnings were \$47,772 and its expenses \$41,472. Doubtless the traffic on this line will not be fully developed until it is completed through to Harlem; but doubtless, also, nearly every passenger that it carries will be diverted from the Third avenue line of the New York Elevated Company, and so add not a cent to the gross income, but considerable to the working expenses of the Manhattan Company, which works them both. We should say that the net income of that company, without taking into consideration interest on the investment, would be decidedly larger without than with the Second avenue line, which, however, the Metropolitan's charter compelled it to build. In the course of years, probably, one road will be insufficient for the traffic, and indeed at certain times of the day the Third avenue line has accommodated it very imperfectly hitherto; but however useful to city travel, this line can hardly be looked upon as in itself a good investment to the proprietors of the elevated railroads, but rather as a price they were compelled to pay for the privilege of having other profitable lines.

As for the prospects of the Manhattan Company, it must be remembered that traffic grows on its roads in greater proportion than the growth of the city, doubtless, for most of the building is in those parts of the city where the elevated railroads must be used by most of the residents; but on the other hand, the new large issue of Metropolitan bonds proposed will increase materially the yearly charges. As the 6 per cent. first-mortgage bonds of the Metropolitan now sell for about par, a second-mortgage will have to pay more than 6 per cent. to be negotiable. The rental paid by the Manhattan Company at present amounts to \$1,160,000 per year for the Metropolitan's lines. This is \$580,000 for the half-year, or nearly 40 per cent. more than the net earnings of those lines in the last half-year. But it will not do to conclude from this that a second mortgage on the Metropolitan lines will not be a good security. The

rental of \$580,000 is made up of \$255,000 of interest and \$325,000 of guaranteed dividends. The net earnings, therefore, though \$164,000 less than the rental, were \$160,000 more than the interest; and however the additional issue of bonds may affect the Manhattan Company, or, in case the lease should fall through, the dividends of the Metropolitan Company, there would be a good margin of profits, at the present rate, to cover all the interest charges.

Though the net earnings of the Metropolitan lines do not cover their rental, those of the New York Elevated show a slight surplus. Its rental consists of \$595,000 interest and \$650,000 dividends per year—for the half-year \$622,500. Its net earnings for the last half-year were \$640,427. Its prospects are quite favorable. The extension to Harlem of the Second avenue line of the Metropolitan will reduce somewhat the traffic on its Third avenue line; but its rebuilt Ninth avenue line will probably profit considerably from its connection with the Metropolitan's line above Fifty-ninth street to High Bridge, and the large summer excursion traffic by steamboats, which it is in the best position to carry because its stations are nearest the steamboat landings.

The popular faith in the stability of the Manhattan Company, and in the financial ability of the two companies whose roads it leases, is expressed in the quotations for the stocks of the two latter companies. Both are guaranteed 10 per cent. dividends by the Manhattan Company, but Monday's quotations were 93 for Metropolitan and 113 for New York Elevated stock. Either price is certainly very low for a 10 per cent. stock of a road with a growing traffic for which it is almost sure to have no competition. The cause is doubtless the fear of legislative interference with the rates, such as was attempted last winter.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

*Osage Valley & Southern Kansas*.—Completed from Tip-ton, Mo., southward to Versailles, 18 miles.

*St. Louis & San Francisco*.—The track of the *Kansas Division* has been extended from Beaumont, Kan., westward to Augusta, 25 miles.

*Southern Pacific*.—Extended eastward to San Pedro Crossing, Arizona, 13 miles.

*Quincy, Missouri & Pacific*.—Extended from Greencastle, Mo., west 10 miles.

This is a total of 66 miles of new railroad, making 1,330 miles thus far this year, against 562 miles reported at the same time in 1879, 312 miles in 1878, and 365 miles in 1877.

SIR HENRY TYLER'S SPEECH, at the half-yearly meeting of the Grand Trunk Railway Company in London, April 29, as usual contained much that is interesting to American railroad men. He had an encouraging story to tell and a crowd of well pleased stockholders to address—not a very common experience in the career of a Grand Trunk President. We are glad to see that he called the attention of a body of English stockholders, and in an address that will be widely read by other English railroad men, to the utter incompleteness of the English railroad reports of the amount of traffic—simply the number of passengers and of tons of freight moved, and never of passenger and tonnage-mileage—a fault which makes it impossible to compare English railroad traffic and average rates and expenses, either one road's with another's, or with those of other countries. The report under consideration at this meeting was that for the last half of 1879, and the comparisons were with the corresponding half of 1878. The freight traffic was twenty per cent. larger in 1879, and the average rate nearly the same,—0.69 cent per ton per mile, or just about the same as the Lake Shore's for the whole year 1879. The average load actually carried was 6.87 tons per freight car, and 10.71 passengers per passenger car. There was, just as on the Lake Shore and the Michigan Central, a great increase in west-bound freight traffic. It was 27.88 per cent. of the whole in 1878 and rose to 31.70 per cent. in 1879. Since 1876 this traffic has increased 90 per cent. while the whole freight traffic has increased but 26 per cent. put in figures, the east-bound freight traffic has increased from 311,000,000 to 348,000,000 ton-miles (12 per cent.) from 1876 to 1879, while the west-bound has increased from 66,000,000 to 125,000,000. With regard to the Great Western, Sir Henry re-asserted that a saving of a million dollars a year could be made by consolidating the two; but he said the Grand Trunk could now afford to wait till the Great Western came to it. The new line to Chicago was the subject of extended remarks as to the way it was made up, the cost and the contemplated expenditures on it. "We do not intend to begin too soon; we mean to go on gradually and perfect it, and make it the best through line between Chicago and the St. Clair River," said the speaker, which, as it is, the only one, it will not be difficult to do. But Sir Henry said further: "But we do not want to turn all the traffic on to that line. We do not want to deprive ourselves of the valuable assistance of the Michigan Central. We have worked for many years with the Michigan Central. \* \* \* We wish to remain on good terms with the Michigan Central." He called attention to the great increase in the market value of Grand Trunk securities since the last meeting, only six months before, which was no less than twenty-seven million dollars, which accounts for the good nature of the stockholders and their unanimous vote to double the salary of their President.

THE NEW YORK ANTI-DISCRIMINATION FREIGHT BILL, which passed the Assembly some weeks ago by an overwhelming majority, this week was reported to the Senate by



its committee with considerable amendments. One of these takes away the limit of the application of the law to shipments of a car-load or more. For certain kinds of shipments it is just as important to have equal rates per 100 lbs. as per car-load, and this amendment is in the direction of equality, though it is said to have been suggested by the railroad interest. An addition requires railroads to carry freight received from other roads and to deliver it to such roads at rates not exceeding its local rates for the distance carried. The prohibition of rebates and drawbacks is limited to such as are secret; and the prohibition of discriminations in the way of higher charges to shipments of "the like kind and quantity under like circumstances and conditions from the same original point of departure to a station at a greater distance on its road in the same direction," which is a decided improvement. Another and a very important change requires actions to recover a penalty for the violation of the act to be "at the instance of the State Engineer and Surveyor by the Attorney-General." The Senate Railroad Committee reported this amended bill Tuesday and it was debated Wednesday. In the course of this debate the following amendment was adopted:

"Nothing in this act shall be so construed as to prevent railroad corporations from making or uniting with railroad companies from any other state or foreign country and making through rates from points outside of this state which are on connecting lines, nor shall the share of any such through rate over a connected line, received by any railroad corporation of this state for transportation over its entire railroad, be held or construed to be the charge or receipt for transportation of freight referred to in this act."

This amendment is indispensable if the New York roads are to have the ability to compete on equal terms with through roads out of the state. Another amendment made declares that penalties for violations of the act may be recovered only by the party aggrieved, and a third exempts coal carried into the state or through it from the provisions of the act. As thus amended the bill was passed to a third reading, and it was expected that it would be passed finally by the Senate Thursday (after we go to press). Having been amended it will have to go back to the lower House and receive a favorable vote there before it can become a law. As amended the bill virtually forbids favoring one shipper more than another on shipments from one point to another within the state; and this is the only traffic on which the railroads can control the rates even approximately.

THE CHICAGO, MILWAUKEE & ST. PAUL has just been making new and important acquisitions of roads in Iowa, Minnesota and Wisconsin. The greatest of these is the Chicago, Clinton, Dubuque & Minnesota, which extends up the west bank of the Mississippi from Clinton, Iowa, to a junction with the St. Paul's Southern Minnesota line opposite La Crosse, Wis. This road was supposed to be built originally in the interest of the Chicago, Burlington & Quincy, which about the same time built a branch of its road to Clinton, but it is really out of the proper field of the Burlington road, and fitted better into the Chicago & Northwestern's system than anywhere else. Now that the St. Paul, through the Chicago & Pacific, has acquired a direct line from Chicago to the Mississippi, it can make very good use of the line, which besides its main line has several branches extending westward from the river. The St. Paul can take its traffic either to Chicago or (by two different lines) to Milwaukee, as may be required. Its Chicago connection will probably be made some distance north of Clinton, where the Western Union line strikes the Mississippi. This will give the St. Paul a line to Dubuque and Clinton, two important river points. It was at one time reported that the Chicago & Northwestern would take this road, which would give it (or could be made to) a good outlet for the narrow-gauge line it has recently acquired from Galena northward. If it bid for it and could not get it, it was doubtless because the St. Paul outbid it.

The other acquisition is the Wisconsin Valley road, also built in the Joy interest, and which there was once talk of uniting with the Clinton road just named. Since the lumber business revived, it is said to have been doing very well, and it was extended considerably last year. It depends chiefly on lumber traffic, or rather on the traffic of a lumbering country.

The Chicago, Milwaukee & St. Paul now has control of nearly all the roads in northwestern Iowa, except the Illinois Central. From the Winona & St. Peter line of the Chicago & Northwestern on the north, to the Iowa Midland line of the same company on the south, a distance of 150 miles, with this exception the St. Paul has all the roads between the Mississippi and the Burlington, Cedar Rapids & Northern road—eleven different lines and branches. This last acquisition completes a road in its control on the west bank of the Mississippi all the way from St. Paul to Clinton, continued further down to Rock Island on the other side of the river.

THE ILLINOIS CENTRAL RAILROAD has recently completed arrangements for city and suburban traffic which give it extraordinary facilities for conducting the largest business that can possibly offer. The line of this road is either directly on the lake shore or on piling in the lake for some five miles south from its main passenger station at the foot of Lake street (not far from the centre of business) in Chicago, and for all that distance it is, we believe, nowhere crossed either by a street or by another railroad. The city extends all along this part of the line, and a little further south is the important suburb of Hyde Park. The absence of crossings enables the trains to keep up any rate of speed down to the very central station. But as the Michigan Central trains also enter Chicago over this road, and there is, therefore, an enormous freight and passenger traffic on it, the advantage was often neutralized. Recently the company has constructed two additional tracks, to be

specially reserved for suburban traffic, for nine miles south of Chicago and reaching all the stations which have any suburban traffic. In addition, a special new equipment has been provided for this traffic, consisting of "double-enders" locomotives something like those on the Metropolitan Elevated in New York, and cars following very closely the very beautiful and easy-riding Metropolitan cars (including, too, the abominable pairs of opposite seats in the centre, so close together that your knees gets badly mixed with those of your *vis-à-vis*). The engines do not turn, but run either end foremost, and the road has this very great advantage over the elevated roads that it can use any weight of engine that may be needed for speed and heavy trains. At present the traffic is chiefly suburban, that is, there is comparative little traffic of passengers from one station to another within the city, and the amount of this business will probably always be limited, because the road is generally half a mile or so east of the parallel business streets where the chief movement of passengers occurs, and the whole business is, of course, a mere trifle compared with that of the New York elevated roads. It runs sixteen suburban trains a day, which is less than are run on an elevated road in an hour. But there is plenty of room for growth, and the growth is sure.

THE PRUSSIAN GOVERNMENT ARGUMENT FOR STATE RAILROAD OWNERSHIP is completed in this number, and we again call particular attention to it. It is pretty solid reading, and perhaps of the kind likely to be skipped, as it is long as well as compact and solid. It is strange to see this document used to support the bills now pending in the New York Legislature, when it expressly declares that all such efforts at regulation must fail, and says it after forty years' experience with an administrative machinery for executing government regulations infinitely more effective than anything that this country or any English-speaking country possesses. It is remarkable how closely parallel are the phenomena of railroad traffic and traffic management in this country and in Prussia, as described in this argument. The inequalities complained of and the methods resorted to in competition seem to be precisely the same, and indicate that they are a normal development from the nature of the business, and not the result of arbitrary dictation or accident.

LAKE AND CANAL RATES have changed considerably during the past week (ending with Wednesday). Lake rates, which were 3½ cents per bushel for corn and 4 to 4½ for wheat from Chicago to Buffalo at the beginning of the week, rose steadily until last Wednesday they were 5½ to 5½ for corn and 6 for wheat—rates that have not been reached at this time of the year before for several years, and more than double the rates at this time last year. There has been some diversion of vessels from the regular trade to carry wheat from Milwaukee and Racine to Chicago to fill contracts before the end of May, and this may have helped to advance rates. Canal rates, which were 5½ cents for corn and 6 cents for wheat from Buffalo to New York at the beginning of the week, advanced half a cent till Monday, and since have fallen off half a cent, ending just as they began. The cost of sending a bushel of corn from Chicago to New York by water last Wednesday was about 12½ cents, against 16.8 by rail.

TRAIN-WRECKING seems to be discouraged in Spain. A telegram from Madrid last Tuesday says that a gang which recently wrecked a train in Andalusia was court-martialed, thirteen of them sentenced to death and thirteen to imprisonment for twenty years. This country stands very much in need of Spanish civilization, and if it could be introduced into Illinois, Missouri, Iowa and certain other parts where the industry of train-wrecking and robbing is followed with considerable success and little danger, we could well afford to give a little "enterprise" or "progress" for it.

#### NEW PUBLICATIONS.

*Testimony on Rates and Traffic Management.*—During the investigation made by the Special Railroad Committee of the New York Legislature last year, Mr. George R. Blanchard, Assistant to the President of the New York, Lake Erie & Western Railroad, occupied the witness stand for no less than eight days, in the course of which he gave a mass of testimony with regard to railroad traffic, rates, the special contracts of the trunk-lines with shippers and their arrangements with each other, the history of trunk-line rates and traffic, the various circumstances which determine a railroad's policy with regard to traffic management, and matters of similar nature. Mr. Blanchard's long experience and the positions he has held have given him most wonderful and extensive knowledge of questions of this kind, which are perhaps the most difficult of all in the whole realm of railroad business to study, because of the absence of any, sufficient record of the facts. At the time the evidence was first printed by the Committee we gave an abstract of it which covered several of our pages, but as the full testimony covered some 800 octavo pages, it may be imagined that a vast deal of important matter was omitted. The questions which came before this investigating committee are constantly made the subject of discussion and inquiry in legislative bodies and the press; and, moreover, they need to be thoroughly understood by every traffic manager—and by that we mean every railroad man who takes any responsibility in traffic management, be he freight or passenger agent, superintendent, director or president—that he may properly perform his duties. We are, therefore, glad to see that Mr. Blanchard has revised his testimony and had it printed in a separate volume—an octavo of about 700 pages. In revising, Mr. Blanchard has left out some matter of minor importance, and has not hesi-

tated to make changes and corrections and even additions, wherever needed for a fuller or better or clearer statement of the facts.

There are a great many things in this testimony which have a historical interest—such as the organizations of the freight lines their contracts with the railroad companies, and their modifications from time to time; the origin of the trunk-line railroad wars and the agreements made when they were settled; the history of the petroleum traffic and the contracts with the Standard Oil Company; the plan for dividing live-stock traffic through "eveners"; the history of the modifications of local rates on the Erie road; the circumstances which affect the making of special rates to manufacturers at local stations, etc.; the terminal services and expenses of the trunk lines, etc.—and which can hardly be found elsewhere, or at least not collected together, and in form easy to refer to. Reference to Mr. Blanchard's testimony has been facilitated by a brief index, the lack of which makes the 2,000 pages of important evidence published by the Assembly Committee so very difficult to examine that it loses fully nine-tenths of its practical value and will not be used one-fiftieth as much as it would be if fully and minutely indexed.

The last number of the *National Quarterly Review* has an article entitled "The Railway Problem," by Simon Sterne, the counsel who conducted the investigation before the Assembly Committee, followed by a rejoinder entitled "Politico-Railway Problems and Theories," by Mr. Blanchard, and these two papers and also Mr. Blanchard's by itself, have been reprinted separately. We have not examined these sufficiently to give any opinion on their value.

### General Railroad News.

#### MEETINGS AND ANNOUNCEMENTS.

##### Meetings.

Meetings will be held as follows:  
Chicago & Northwestern, annual meeting, at the office in Chicago, June 3.  
Boston, Concord & Montreal, annual meeting, in Plymouth, N. H., May 24.  
Manchester & Lawrence, annual meeting, in Manchester, N. H., May 28.

##### Annual Conventions.

Meetings of various railroad and engineering associations will be held as follows:  
The American Society of Civil Engineers will hold its annual convention in St. Louis, Mo., beginning Tuesday, May 25. T. J. Whitman, Secretary Local Committee, St. Louis.  
The Passenger Conductors' Life Insurance Company of the United States will hold its ninth annual convention at the Maxwell House, in Nashville, Tenn., beginning May 31.  
The Master Car-Builders' Association will hold its fourteenth annual convention in Detroit, Mich., beginning Tuesday, June 8.  
The Yard-Masters' Mutual Benefit Association, of the United States and Canada, will hold the sixth annual convention at the Revere House, Boston, Mass., beginning June 9 next.

##### Dividends.

Dividends have been declared as follows:  
Danbury & Norwalk, 1½ per cent., quarterly, payable June 1. The company has not paid regular dividends for several years, but expects to do so hereafter.  
Cleveland & Pittsburgh (leased to Pennsylvania Company), 1½ per cent., quarterly, payable June 1.

##### Foreclosure Sales.

The Washington City, Virginia Midland & Great Southern road was sold in Alexandria, Va., May 13, the writ of *superedeas* granted a few days before having been withdrawn. It was bought for \$4,500,000 by R. T. Baldwin, J. Wilcox Brown and Robert Garrett, the Purchasing Committee representing the bondholders. A plan of reorganization has been adopted, as we have heretofore noted, and a new company will probably be formed as soon as the sale is confirmed. It will be controlled by the Baltimore & Ohio.

#### Western Association, General Passenger and Ticket Agents.

This association held a meeting in Indianapolis last week, the chief business of which was the adoption of the following agreement:

1. That all orders for tickets, books of orders and all tickets shall at once be withdrawn from all offices and from all persons except our regularly recognized ticket agents and ticket offices at the termini or along the line of our respective roads; that said orders or tickets shall not again be re-issued.
2. That no personal orders for tickets of our respective issues shall be honored when drawn, sold or issued by any person save the regular recognized agents of our respective companies located at the points named in the first resolution; it being understood that the resolution is intended to prohibit the honoring of all orders from outside parties, no matter if said orders are accompanied by the cash value of the tickets so ordered, or with a request to send C. O. D.
3. That from and after June 1, 1890, the members of this Association will exclusively depend upon their connections to furnish all tickets and all rates for tickets on all business emanating from or originating in the territory of said connection.
4. That we will not permit any of our agents to pay any rebates, drawbacks or commissions to any passenger, or to in any way cut or reduce rates to passengers at any point in the territories of our connections, or at any point off our respective roads; nor shall our agents offer any concessions or inducements to passengers to induce said passengers to come out of the territory of our connections to purchase tickets of our respective issues, as it is our desire and intention that all passengers shall, so far as possible, be obliged to purchase tickets at their home offices.
5. That we pledge ourselves and our respective roads that should any road, member of this Association, by its officers or its agents, persistently violate any portion of these resolutions, the members of this Association whose rates or territory are affected by said violation, will at once withdraw from sale all tickets that read over any portion of the offending road, and will not again place them on sale until said offending road has, to the satisfaction of the road offended by the violation named, purged itself of its offenses.
6. That all violations of these resolutions shall at once be certified to the Secretary of this Association, who shall at once notify all members of the Association as to the facts in the case.



## Conference on East-Bound Rates.

A dispatch from Baltimore, May 19, says: "At a meeting of the representatives of the trunk-lines of railroads in this city, yesterday, it was decided that no reduction of the present rates of east-bound freights would be made at this time. There were present Second Vice-President W. K. Vanderbilt, Third Vice-President J. H. Rutter and General Passenger Agent C. B. Meeker, of the New York Central Railroad; President G. B. Roberts and Vice-President A. J. Cassatt, of the Pennsylvania Railroad; President H. J. Jewett and George R. Blanchard, Assistant to the President, of the Erie Railroad; President John W. Garrett, General Freight Agent M. A. Smith, General Passenger Agent C. K. Lord, and General Ticket Agent L. M. Cole, of the Baltimore & Ohio Railroad, and Albert Fink, Commissioner of Trunk Lines.

"Matters of mutual interest were discussed by representatives and it is said that there was great unanimity of opinion. The low rates at which grain is brought from the West, by the lakes and canal to New York is seriously affecting the grain trade of this city.

"It was also decided to continue the Board of Arbitration another year with the present members, Charles Francis Adams, Jr., David A. Wells and John A. Wright."

## ELECTIONS AND APPOINTMENTS.

**Atchison, Topeka & Santa Fe.**—At the annual meeting in Topeka, Kan., last week, the following directors were chosen: L. Severy, Emporia, Kan.; C. K. Holliday, Topeka, Kan.; B. F. Springfield, Atchison, Kan.; S. A. Kent, Chicago; W. Rowell Mason, Walpole, N. H.; I. T. Burr, B. P. Cheney, T. Jefferson Coolidge, J. C. Paine, Alden Spear, S. L. Thorndike, Boston. The board elected T. Jefferson Coolidge, President; W. B. Strong, Vice-President and General Manager; E. Wilder, Secretary and Treasurer; G. L. Goodwin, Assistant Secretary and Treasurer; J. P. Whitehead, General Auditor; E. Young, Auditor; S. L. Thorndike, Comptroller; A. S. Johnson, Land Commissioner. These officers are all re-elected except Mr. Coolidge, who succeeds Mr. Thomas Nickerson, and Mr. Thorndike, whose office is a new one.

**Car Accountants' Association.**—At the annual convention in Louisville, April 28, the following officers were chosen: President, S. B. McConico, New Orleans; Vice-President, F. M. Luce, Chicago; Secretary and Treasurer, W. E. Beecham, Milwaukee.

**Cedar Rapids, Sigourney & Ottumwa.**—At the recent annual meeting the following officers were chosen: President, J. M. Hendrick, Ottumwa, Ia.; Vice-President, N. M. Hubbard, Cedar Rapids, Ia.; Secretary, S. L. Fonda, Sigourney, Ia.; Treasurer, M. A. Higley, Cedar Rapids.

**Chicago, Burlington & Quincy.**—Mr. Edward A. McCulloh, for a long time chemist in the testing department of this road, has been appointed General Store-keeper, succeeding Mr. Jay Morton.

**Cleveland & Marietta.**—This company is organized as successor to the Marietta, Pittsburgh & Cleveland, with the following directors: D. Putnam, Marietta, O.; Isaac Morton, Cambridge, O.; L. C. Baldwin, Cleveland, O.; F. H. Short, C. W. West, Cincinnati; Charles Lanier, John Paton, New York; C. W. Willard, Washington. The board elected Isaac Morton, President; L. C. Baldwin, Vice-President and General Manager.

**Detroit, Lansing & Northern.**—At the annual meeting in Detroit, May 12, the following directors were elected: Nathaniel Thayer, John A. Burnham, H. H. Hunnewell, Geo. O. Shattuck, Charles L. Young, Chas. Merriam, Charles Francis Adams, Jr., Nathaniel Thayer, Jr., James H. Blake, Alpheus Hardy and A. H. Hardy, all of Boston.

**Erie & Pittsburgh.**—Mr. C. M. Large is appointed Acting Road-Master, in place of A. H. Falkner, deceased.

**Fernandina & Jacksonville.**—The officers are as follows: President, James W. Fellows; Vice-President, James O. Hoyt; Secretary, E. N. Dickerson, Jr.; Treasurer, E. H. Harriman.

**Georgia.**—The full list of directors chosen at the annual meeting last week is as follows: C. H. Phinizy, President; E. P. Alexander, James W. Davies, James S. Hamilton, Stevens Thomas, M. P. Stovall, George T. Jackson, L. M. Hill, Josiah Sibley, H. D. McDaniel, George Hillyer, John Davison, William M. Reese, John H. James, Joel A. Billups, N. L. Hutchins, H. H. Hickman, directors. The new board held a meeting immediately after the adjournment of the convention. Gen. E. P. Alexander was elected Vice-President, and Colonel S. K. Johnson was re-elected Superintendent.

**Hanover Junction, Hanover & Gettysburg.**—At the annual meeting held May 10 the following were chosen: President, Capt. A. W. Eichelberger, Hanover, Pa.; Directors, Peter Flickinger, Jacob Forney, Wm. Grumbine, Stephen Keefe, John Nyman, Robert M. Wirt, Reuben Young, Hanover, Pa.; Mathew Eichelberger, David Wills, Gettysburg, Pa.; Wm. Buehler, Baltimore.

**Illinois Freight Association.**—Mr. A. W. Adams has been chosen Secretary. He was formerly Freight Auditor of the Chicago & Alton.

**Illinois Midland.**—All communications relating to passenger business should hereafter be addressed to A. E. Shrader, Traffic Manager, at Terre Haute, Indiana.

**Indianapolis & Vincennes.**—At the annual meeting in Indianapolis, May 13, the following directors were chosen: J. E. Perkins, Oran Perry, Indianapolis; W. H. Barnes, J. N. McCallough, Thomas D. Messler, Wm. Thaw, Pittsburgh; George B. Roberts, Philadelphia. Messrs. Perkins and Perry are new directors, succeeding Thomas A. Scott and H. H. Houston.

**Indianapolis, Delphi & Chicago.**—Mr. John S. Day has been appointed General Manager. He was formerly General Superintendent of the Louisville, New Albany and Chicago.

**Kansas City, Ft. Scott & Gulf.**—Mr. L. W. Towne has been appointed Superintendent of this road and the Kansas City, Lawrence & Southern, in place of T. F. Oakes, who goes to Oregon. Mr. Towne has managed the Atchison & Nebraska very successfully for several years.

**Keyser & Pendleton.**—This company has been organized by the election of the following: President, J. B. Rees; Vice-Presidents, John Miller, C. H. Nandiver; Directors, J. Ashfield, John Hughes, C. S. Huffman, J. W. Keys, T. E. McCool, J. H. Markwood, H. V. Neal, G. W. Parsons, A. P. Ritzell, Orlando Shay, G. F. Sims; Secretary, C. E. Brant; Treasurer, T. B. Frye.

**Leadville, Roaring Fork & Gunnison.**—The directors of this new company are: R. G. Dill, S. J. Hanna, Andrew Pearson, M. L. Rice, C. B. Rustin, A. A. Smith, H. A. W. Taber, A. J. White, H. S. Wicks. Office in Leadville, Colorado.

**Littlestown.**—At the annual meeting held May 10 the fol-

lowing were chosen: President, Wm. McSherry; Directors, Alexander J. Frey, George D. Klinefelter, Joseph L. Shorb, W. Latimer Small, George Stonesifer, John S. Young; Secretary and Treasurer, George Stonesifer. The road is leased to the Pennsylvania, forming part of the Frederick Division.

**Louisville & Nashville.**—Mr. B. F. Guthrie is appointed General Manager and V. Rose Superintendent of this company's Express Bureau.

**Master Mechanics' Association.**—At the annual convention in Cleveland, May 13, this Association elected officers as follows: President, J. N. Lauder, Northern (New Hampshire); Vice-Presidents, Reuben Wells, Louisville & Nashville, and J. D. Barnett, Grand Trunk; Secretary, J. H. Setchel, Little Miami; Treasurer, S. J. Hayes, Illinois Central.

**Mexican Central.**—At a meeting of the board in Boston, May 15, Mr. Thomas Nickerson was chosen President in place of Warren Sawyer, resigned.

**New York & Harlem.**—At the annual meeting in New York, May 18, the old board was re-elected, as follows: James H. Banker, Samuel F. Rarger, Abraham B. Baylis, John E. Burrill, Chauncey M. Depew, John B. Dutcher, Joseph Harker, Wm. H. Leonard, Robert J. Niven, Augustus Schell, Wm. H. Vanderbilt, Wm. K. Vanderbilt, Cornelius Vanderbilt.

**New York & New England.**—The following circular is dated May 1:

"Mr. O. M. Shepard is hereby appointed Superintendent of Construction on the Western Extension of this road, and as such will have charge of the work of construction, subject to instructions of the Vice-President and the Chief Engineer. He will also have charge of the receipt and distribution of materials.

"Mr. E. M. Humstone is hereby appointed Master Mechanic at the Hartford shops."

**New York, Pennsylvania & Ohio.**—The office of Wm. Fuller, General Master Mechanic, has been removed from Meadville, Pa., to Cleveland, Ohio.

**Ontonagon & Montreal River.**—At a meeting held in Duluth, Minn., May 15, Col. J. B. Culver was chosen President and James Baron, Secretary.

**Pittsburg, Ft. Wayne & Chicago.**—At the annual meeting in Pittsburg, May 19, the four directors whose terms then expired were re-elected for the three years, as follows: Geo. W. Cass, Charles Lanier, J. N. McCullough, Samuel J. Tilden. Mr. George B. Roberts was chosen a director to fill the unexpired term of Thomas A. Scott, resigned.

**St. Paul, Minneapolis & Manitoba.**—At the annual meeting in St. Paul, Minn., May 13, the following directors were chosen: R. B. Angus, R. B. Galusha, J. J. Hill, Norman W. Kittson, St. Paul; Donald A. Smith, George Stephen, Montreal; O. H. Northcote, London, England. The board re-elected the old officers as follows: President, George Stephen; Vice-President, R. B. Angus; General Manager, James J. Hill; Secretary and Treasurer, Edward Sawyer.

**Scioto Valley.**—Mr. Joseph Robinson has been chosen Superintendent, in place of H. L. Morrill, resigned.

**Seaboard & Roanoke.**—At the annual meeting in Portsmouth, Va., May 14, the following were chosen: President, John M. Robinson; Directors, David A. Barnes, Richard Dickson, Nulbro Frazier, R. C. Hoffman, Enoch Pratt, Moncure Robinson.

**Sonora.**—At a meeting of the board in Boston, May 15, Thomas Nickerson was chosen President, and S. W. Reynolds Clerk and Treasurer, in place of B. P. Cheney and C. L. Goodwin, resigned.

**Texas & St. Louis.**—At the annual meeting in Tyler, Tex., May 18, the following directors were chosen: J. W. Parhamore, W. M. Senter, J. H. Sloss, Logan H. Roots, T. R. Bonner, J. P. Douglas, R. H. G. Minty, S. G. Demoss, A. W. Ferguson.

**Union Pacific.**—Government directors are appointed as follows: Daniel Chadwick, of Connecticut; Ralph P. Buckland, of Ohio; George B. Smyth, of Iowa; C. C. Housel, of Nebraska.

**Western, of Alabama.**—Mr. Charles H. Phinizy has been chosen a member of the joint board of management, in place of Gen. E. P. Alexander.

## PERSONAL.

—Mr. H. L. Morrill has resigned his position as Superintendent of the Scioto Valley road, but will remain Vice-President of the company.

—Mr. Joseph Stevenson, for many years connected with the Nashville, Chattanooga & St. Louis, and for several years General Baggage Agent, died in Russellville, Ky., May 9, after a long illness.

—Mr. Charles P. Appleby has resigned his position as General Passenger Agent of the Illinois Midland road. No appointment will be made for the present, the Traffic Manager attending to the business.

—Mr. J. Gregory Smith, Trustee and Receiver of the Vermont Central, later President of the Central Vermont and the first President of the Northern Pacific, is spoken of as United States Senator from Vermont.

—Mr. Benjamin W. Gale, who died in New York, May 14, aged 90 years, was, many years ago, a director of the New York & Erie Company. He was at one time a prominent merchant, but retired from business 30 years ago.

—It is reported that the presidency of the East Tennessee, Virginia & Georgia Company has been offered to Col. E. W. Cole, late of the Nashville, Chattanooga & St. Louis. He has not yet decided whether to accept or decline the position.

—Mr. Chauncey Brooks, an old and wealthy citizen of Baltimore, died in that city May 18, aged 87 years. He was formerly for many years a director of the Baltimore & Ohio company, and for several years President of the company.

—Hon. Joseph E. Brown, President of the Western & Atlantic Company, has been appointed United States Senator from Georgia, in place of John B. Gordon, resigned. Gov. Brown was at one time prominent in Georgia politics and was Governor of the state.

—Mr. Wm. B. Brinsmade died at Washington, Conn., May 15, aged 61 years. He graduated at Yale College in 1840, and became a civil engineer. After working on several roads he went to the Connecticut River Railroad in 1857, and was finally made Superintendent. He resigned that

position on account of ill health in 1868, and has since done no active work.

—In the Orphans' Court in Pittsburgh, last week, a final decree was made on the estate of Wm. Phillips, formerly President of the Allegheny Valley road. The account filed shows a balance for distribution of \$6,685.93. The claims against the estate amount to \$269,755.57, of which the amount due the Allegheny Valley Company is \$397,974.80. Mr. Phillips was considered a rich man, but after he died it appeared that he had been spending other people's money, and now his estate will pay about three-quarters of a cent on the dollar.

—Mr. H. Bartels, whom many American railroad men will remember as having been sent by Prussia to study our railroads in 1876, and who has published one part of an extensive work on them, besides a monograph on the organization of the Pennsylvania Railroad (which he admired especially), in the reorganization of the Prussian state railroads, consequent on the acquisition of additional roads, has been appointed on the operating management of the Berlin & Dresden Railroad, with office at Berlin, and with the rank of "Inspector of Construction and Operation." He has lately been in Münster.

## TRAFFIC AND EARNINGS.

## Railroad Earnings.

Earnings for various periods are reported as follows:

Four months ending April 30:

	1880.	1879.	Inc. or Dec.	P. c.
Ala. Gt. Southern...	\$180,801	\$133,051	I.	36,750 49.5
Cairo & St. Louis...	109,828	73,549	I.	36,279 49.4
Ches. & Ohio...	845,187	483,527	I.	360,660 74.0
Chi. & Ind. & Pac.	501,225	151,349	I.	349,876 33.0
Chi. & West. Mich.	202,234	200,321	I.	1,913 30.9
Cleve., Mt. Ver. & Del.	139,735	111,917	I.	27,818 24.9
Den., So. Park & Pac.	716,880	135,055	I.	580,831 427.1
Great Western...	1,557,907	1,380,991	I.	176,916 12.4
Ind. Bloom. & West.	377,017	330,702	I.	46,315 12.0
Kan. City, Fort Scott & Gulf.	307,245	241,476	I.	65,769 52.1
Minn. & St. Louis...	177,096	123,729	I.	53,367 69.0
St. Paul & Duluth...	144,300	101,526	I.	42,774 42.1
Net earnings...	23,505	10,585	I.	12,920 41.7
Wisconsin Valley...	108,019	49,037	I.	58,982 122.2

Three months ending March 31:

	1880.	1879.	Inc. or Dec.	P. c.
At., Miss. & Ohio...	\$404,244	\$304,147	I.	100,097 35.7
Net earnings...	282,141	142,060	I.	140,081 97.0
Bur., Cedar Rapids & No.	537,812	320,563	I.	217,249 64.7
Net earnings...	200,086	115,256	I.	84,830 82.1
Carolina Central...	140,188	129,278	I.	10,910 8.4
Central Iowa...	61,340	61,340	D.	313 0.5
Net earnings...	225,800	157,706	I.	68,094 43.2
Ches. & Ohio...	100,132	47,801	I.	52,331 109.5
Net earnings...	923,778	322,916	I.	600,862 92.1
Louisville & Nashville...	1,854,400	1,302,693	I.	551,707 42.3
Net earnings...	812,702	490,564	I.	312,138 63.8
N.Y. & New Eng'nd...	497,985	398,025	I.	99,960 24.7
Net earnings...	146,638	89,053	I.	57,585 64.7
St. L., Iron Mt. & So.	1,497,738	1,026,337	I.	471,401 45.8
Net earnings...	591,759	350,130	I.	241,629 69.0
Month of April:				
Ala. Gt. Southern...	\$45,344	\$33,464	I.	\$11,880 35.4
Cairo & St. Louis...	31,025	19,372	I.	11,653 63.2
Ches. & Ohio...	221,409	102,611	I.	118,798 36.1
Chi. & Ind. & Pac.	48,719	36,149	I.	12,570 34.7
Chi. & West. Mich.	70,910	54,061	I.	16,849 29.5
Cleve., Mt. Ver. & Del.	35,604	31,322	I.	4,282 13.7
Den., So. Park & Pac.	238,939	44,090	I.	194,849 442.0
Ind. Bloom. & West.	90,374	90,229	I.	145 0.16
Kan. City, Fort Scott & Gulf.	82,639	61,002	I.	21,637 35.5
Minn. & St. Louis...	38,002	33,302	I.	4,700 14.0
Pitts., Titusville & Buff.	55,700	41,704	I.	13,996 33.5
Net earnings...	31,800	9,821	I.	21,979 223.8
St. Paul & Duluth...	35,000	27,041	I.	7,959 29.6
St. P., Minn. & Manitoba...	333,014	239,091	I.	93,923 38.7
Texas & Pacific...	173,000	104,103	I.	68,897 66.1
Wisconsin Valley...	33,145	14,852	I.	18,293 122.8

First week in May:

	1880.	1879.	Inc. or Dec.	P. c.
Chi. & Eastern Ill.	\$29,481	\$16,382	I.	\$13,099 79.9
Chi., Mil. & St. P.	235,000	180,969	I.	54,031 29.8
Minn. & St. Louis...	8,633	7,164	I.	1,469 20.7
St. L., Iron Mt. & So.	98,900	72,325	I.	26,575 36.8

Week ending April 30:

	1880.	1879.	Inc. or Dec.	P. c.
Great Western...	\$91,214	\$74,308	I.	\$16,906 22.8

Week ending May 8:

	1880.	1879.	Inc. or Dec.	P. c.
Grand Trunk...	\$161,810	\$151,916	I.	\$9,894 6.5

## Grain Movement.

For the week ending May 8, receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past seven years:

	Northwestern receipts.	Total receipts.	By rail.	P. c. Atlantic receipts.
1874.....	3,169,221	3,022,086	929,349	23.7 4,035,555
1875.....	2,536,545	3,478,238	1,236,079	35.6 4,645,615
1876.....	2,302,046	3,841,496	2,302,940	60.1 3,000,003
1877.....	2,853,906	2,525,207	1,214,861	48.1 2,684,629
1878.....	4,369,785	4,822,441	1,901,939	39.5 5,704,275
1879.....	3,550,963	4,175,308	1,624,849	39.9 4,450,571
1880.....	4,632,478	4,578,081	1,884,501	41.1 2,893,303

The receipts of the Northwestern markets are 24 per cent. more than in the week next previous and are the largest this year save one week, and larger in any week last year till the last week of May. The shipments of these markets are the largest for four weeks, and larger than in the corresponding week of any previous year. The rail shipments were the largest since navigation was open, and larger than in the corresponding week of last year, though rates were very much lower then. The receipts at Atlantic ports were a third less than in the previous week, and were the smallest since February—due probably to the effect of the opening of canal navigation, which caused shipments to be made by lake and canal, which in that week had hardly begun to arrive.

Of the receipts of Northwestern markets Chicago had 54.8 per cent.; Toledo, 14.1; St. Louis, 12.4; Peoria, 8.5; Milwaukee, 7; Cleveland, 1.7, and Detroit, 1.4 per cent. The effect of the opening of navigation is most marked on the Chicago receipts, which are a larger proportion of the whole than before since navigation closed in the fall.

Of the receipts of the Atlantic ports, New York had 48.9 per cent., Philadelphia 14.8, Boston 11.6, New Orleans 9.2,



Montreal 8.9, Baltimore 6.4, and Portland 0.2. With this week Montreal appears and Portland disappears for the first time this season as an important receiver of grain. But the most remarkable feature in these receipts is the great decline at Baltimore. They are about one-third as great as its receipts the week before, and not one-eighth of its receipts five weeks ago. It has not had so small receipts before since 1877, and only twice in that year. The Philadelphia receipts also are 45 per cent. less than the preceding week, and are the smallest since the first week of February. The exports of flour and grain from Atlantic ports for four weeks have been:

	Week ending			
	May 12.	May 5.	Apr. 28.	Apr. 21.
Flour, lbs.	89,533	75,479	91,014	59,917
Grain, bush.	2,820,626	3,065,175	4,210,038	4,748,482

The export movement, therefore, has been declining decidedly and quite rapidly.

#### Coal Movement.

Anthracite coal tonnages reported for the week ending May 6 were: 1880, 396,240; 1879, 552,430; decrease, 156,190 tons, or 28½ per cent. Most of the companies are now running half time only.

Clearfield, Broad Top and Cumberland tonnages for the week were 71,688 tons.

The coal tonnage of the Pennsylvania Railroad for the four months to April 30 was as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Anthracite	350,760	292,638	I. 58,122	19.9
Semi-bituminous	592,647	571,988	D. 20,659	3.6
Bituminous	807,118	545,181	I. 261,937	48.0
Coke, Pennsylvania	645,398	400,352	I. 245,046	61.2
Total	2,395,923	1,810,159	I. 585,764	30.7

The decrease in semi-bituminous tonnage is due to the strike of the miners in the Clearfield Region.

#### The Southern Pacific and the California Grain Trade.

With the finishing of the Southern Pacific Railroad, the grain business of this coast will be revolutionized. In about eighteen months cars will carry wheat, not in sacks, but in bulk, to Galveston, and there iron ships will receive the consignments and transport direct to Liverpool. The saving in sacks, insurance and time will permit the railroad company to charge such an advance over ship rates as will justify them in this new carrying business. This branch of trade will prove the justification of the company in building its many hundreds of miles of track across barren sand deserts, and furnish compensation for their outlay. As a consequence, of course, of this innovation in grain transit, many a sail will flap idly against its mast that now whitens the winds of commerce, or will be diverted to other trade. In view of this predestined change in our staple trade, the question of a ship canal across the isthmus loses to us much of its interest and importance.—*San Francisco Evening Post.*

#### Chicago Shipments Eastward.

The shipments of freight eastward over the lines in the pool have been decreasing pretty steadily since navigation opened. For the week ending May 8, they amounted to 23,480 tons, and for the week ending May 15, to 21,165 tons, which is but one-fourth as much as the shipments for one week in March. The light shipments have been charged to the 80 per cent. rate; but we notice that the lake shipments are not particularly large.

#### RAILROAD LAW.

##### Railroad Police in Maryland.

The Maryland Legislature at its recent session passed the following sections additional to the general code, section on corporations:

231. Corporations owning or using any railroad, steamboat, canal, furnace, colliery or rolling mill, in this state, may, jointly or severally, apply to the Governor to commission such persons as the said corporation or corporations may designate, to act as policemen for the protection of the property of said corporation or corporations and for the preservation of peace and good order on their respective premises, railroad trains or steamboats.

232. The Governor, upon such application, may, if he thinks it proper so to do, appoint such persons, or so many of them as he may deem proper, to be such policemen, and shall issue to each person so appointed a commission, and shall transmit such commission to such clerk of office in the state, as may, by such corporation or corporations, be requested, and he may revoke and annul any such appointment at his pleasure.

233. Every policeman so appointed shall before entering upon the duties of his office take and subscribe before a justice of the peace of the county or city in which his commission may be received the oath or affirmation prescribed by the fourth section of the first article of the constitution, which oath or affirmation shall be recorded in the clerk's office of such county or city, and every such policeman so appointed, after the recording of the oath or affirmation to be by him taken as aforesaid, shall possess and exercise in the counties and cities in which the railroads, canals, collieries, furnaces, rolling-mills and premises of the corporation for which he may have been appointed are respectively situated all the authority and powers held and exercised by constables at common law, and under the statutes of this state and also all the authority and powers conferred by law on policemen in the city of Baltimore.

234. Every such policeman shall, when on duty, except when on detective duty, wear a metallic shield, with the word "Police" inscribed thereon, and said shield shall always be worn in plain view, except when he is employed as a detective.

235. The compensation of every such policeman shall be paid by the party or parties upon whose recommendation he was appointed, and neither the state nor any county therein shall be responsible for any part of such compensation.

236. Whenever the services of any policeman, so appointed as aforesaid, shall no longer be required, a notice in writing to that effect shall be given by the corporation or corporations at whose instance he was appointed, and such notice shall be filed in the clerk's office where the commission and oath or affirmation of such policeman shall have been recorded, which notice shall be noted by such clerk upon the margin of the record where such commission and oath or affirmation are recorded, and thereupon the power of such policeman shall cease and be determined.

##### Road and Stream Crossings in Maryland.

At the recent session of the Maryland Legislature, Section 17 of the law of 1876 to regulate railroad crossings was repealed and a new section enacted in its place as follows:

Sec. 17. That it shall be lawful for such corporation, whenever it may be necessary in the construction of its road to cross any road, highway or stream of water, to divert the same from its present or existing location or bed, provided it is not a navigable stream; and it shall be lawful for such

corporation, or for any railroad corporation heretofore incorporated under any general or special law, whose railroad now crosses or may hereafter cross any public or private road or highway, to carry said road or highway over its track by an over-grade crossing, or to carry it under its track or tracks by an under-grade crossing, and to make such crossings such corporations may divert any road or highway so crossed, or to be crossed from its present or existing location, and for entering upon, taking or appropriating any building, gardens, yards or other lands, which may be necessary for the new route and location of said road so diverted, said corporation may proceed as in case of land necessary for its railroad under the powers given to it by law, but said corporation shall, without unnecessary delay, place such road, or highway, or stream in such condition as to not impair its former usefulness; and provided, such corporation shall be liable for damage caused by the diversion of any stream, and when said new road is properly laid out, completed and constructed by said company, with such over-grade or under-grade crossing, in a manner satisfactory to the county commissioners of the county where said road is located, it shall be the duty of the said county commissioners to close the old road and grade crossings, and it shall be lawful for such company to close the former grade crossing.

#### Road-Crossing Accidents—Negligence.

In Righter against the Pennsylvania Railroad Co., the New Jersey Court of Errors lately decided as follows:

1. It is a part of the rule of contributory negligence that the plaintiff's negligence act must proximately contribute to his injury; but if it so contribute, the comparative degrees of the plaintiff's and defendant's negligence will not be considered.

2. If the case presents a fairly debatable question whether the plaintiff's negligent conduct did so contribute, the solution of that question is for the jury; but if it clearly appears that such conduct did contribute, then the Court should direct a non-suit.

3. It is a primary rule of legal caution that a person about to cross a railroad is bound to use his eyes and ears, to watch for sign-boards and signals, to listen for bell and whistle and to guard against the approach of trains, by looking each way before crossing.

4. The failure of the company to provide or give a statutory signal will not relieve a person from making this observation, if he has an opportunity, by a view of the road, to avoid danger.

5. A servant driving a carriage along a street crossing a railroad, and having, while yet at a point distant over thirty feet from the railroad-track, a view of the same for a mile to the south, drove across the track, and the rear of his wagon was struck by a train coming from the south, and the wagon was demolished and the persons within it injured. Held, That the negligent act of the servant contributed to the injury. Held, That the fact that a train was just starting from a station one quarter of a mile north, and blowing a whistle, could not have distracted the servant's attention so as to relieve him from his duty to look south.

#### THE SCRAP HEAP.

##### Railroad Equipment Notes.

The Chicago Steam Forge Works are running over-time on large orders for car axles.

The Atlantic & North Carolina Railroad shops, in Newberne, N. C., have nearly completed a new locomotive for the road. It is the first entire engine ever built there.

The Knoxville Car Wheel Co., at Knoxville, Tenn., is running full time on orders.

The Rogers Locomotive Works, in Paterson, N. J., have completed two engines for the New Haven & Northampton road. They are now delivering a number of engines to the Wabash, St. Louis & Pacific.

The Pullman Car Works in Detroit have now in hand 35 passenger cars for the Metropolitan Elevated road in New York; 5 passenger and 2 parlor cars for the Wabash, St. Louis & Pacific; 3 sleeping cars for the Chicago & Alton; 4 passenger cars for the Louisiana Western; 10 sleeping cars for the Denver & Rio Grande; 8 hotel cars to run between St. Louis and Denver; 4 sleeping cars for the Atchison, Topeka & Santa Fe; 4 passenger and 2 baggage cars for the Denver, South Park & Pacific; 2 passenger and 2 baggage cars for the Peoria, Decatur & Evansville; 2 sleeping cars for the Chicago, Rock Island & Pacific; a combination car for the Columbus & Hocking Valley; an officers' car for the St. Louis, Iron Mountain & Southern; and an officers' car for the St. Paul, Minneapolis & Manitoba.

The Michigan Car Co., in Detroit, is building an addition to the foundry and several other buildings.

The Detroit Car Spring Works are putting in a new heating furnace and additional machinery for making springs.

The new Russell Car Wheel Foundry in Detroit is nearly ready for use.

The car-works of Murray, Dougal & Co., at Milton, Pa., were burned down May 14, in a fire which destroyed nearly the whole town. The loss is estimated at \$100,000, which is only partly covered by insurance.

##### Iron and Manufacturing Notes.

Port Carbon Furnace, at Port Carbon, Pa., chilled recently while making a trial of a patent process, but will be cleared out and go into blast again by June 1.

The Knoxville Car Wheel Co. is running its blast furnace in Carter County, Tenn., and is building a second stack, which will be finished by July.

Messrs. Plumb, Burdick & Barnard, of Buffalo, N. Y., are now building for the Pennsylvania Railroad a bolt forging machine capable of heading 2½-inch iron and arranged for upsetting bridge rods and doing a variety of special work.

The Philadelphia & Reading Coal & Iron Co. is rebuilding St. Clair Furnace, near Pottsville, Pa. It will be ready to go into blast next month.

The Receiver of the Oxford Iron Co. has closed the works at Oxford Furnace, N. J., the reason given being that it is impossible to continue work at a profit unless there is a reduction of wages, and the men have refused to continue work if one is made.

Park, Brother & Co., of the Black Diamond Steel Works, in Pittsburgh, have just put their Siemens open-hearth steel plant in operation. It consists of two 7-ton furnaces. The firm are also laying the foundations for a 17-ton steam-hammer, intended for forging steel shafts and other heavy work.

##### Bridge Notes.

The Keystone Bridge Co., of Pittsburgh, has just finished a bridge over the Erie Canal in Buffalo, for the New York Central's new cross-town line in that city.

The contract for an iron highway bridge over Swift River at Bondville, Mass., has been let to the Wrought Iron Bridge Co., of Canton, Ohio.

H. S. Hopkins & Co., of St. Louis, are about to build a large shop for their business. It will be near the Laclede Rolling Mills.

The Monongahela Bridge Co., at Pittsburgh, has decided to build its new bridge with four spans, two of 170 ft. each, and two over the channel of 350 ft. each. It is still undecided whether the bridge is to be a steel truss or a suspension bridge.

#### Prices of Rails.

Steel rails are still lower; quotations are \$65 to \$70 per ton at mill, and some large orders are reported as placed at \$65.

Iron rails are also lower. The market is reported unsettled at \$48 to \$50 per ton at mill for heavy sections. Sales have not been large; there is a considerable demand, but buyers are holding back, hoping for lower prices.

Old iron rails are dull and lower; Philadelphia quotations are \$25 to \$27 per ton, with few sales reported.

#### Ballast.

An exchange would like to know if it is allowable to refer to a retired baggage-master as a "busted ex-checker." We think not.

A conductor on a Pennsylvania railroad collected fare from a lady a few days since. After he passed on she remarked to a companion with her: "I wonder why he charged me fare this time; he never has before." The General Superintendent of the road was seated in the seat behind her. The conductor is now taking a vacation, and has plenty of time to reflect upon the policy of passing lady friends gratis.

A railroad man accused of drinking lager beer while on duty calmly assured the superintendent that he was the victim of color-blindness and supposed that he was drinking water.

#### A Heavy Forging.

Within the past few days there was turned out at the Paterson Iron Works the heaviest and largest forging ever completed in Paterson, or, as we are informed, in the country. The work was a stern frame for the steamship W. A. Shelton, which had broken down and is now being repaired in New York. The stern frame itself weighs 11 tons and is in size 22 x 37 ft.; besides which there is the rudder weighing between four and five tons. This immense mass was too large to be taken through the Bergen tunnel on the Erie flats and had to be transported to the lighter at Jersey City, just below the Erie Railway Company's arch, by horses, 14 being used for that purpose. The forging was finished on Tuesday after a full double force of men had worked at it unceasingly for 35 nights and days. The hub of this work is 30 in. in diameter; about double the usual size. It is undoubtedly the very heaviest forging ever done in this country and the Paterson Iron Works were most naturally applied to as not only having superior facilities for heavy forgings, but also owing to the fact that the works have before turned out some of the most ponderous masses of iron called for in steamship building and for other purposes.—*Paterson (N. J.) Press.*

#### Highest and Lowest Prices of Various Iron Products from 1878 to May 12, 1880.

No. 1 anthracite foundry pig iron sold at Philadelphia at an average of \$18½ a ton in January, 1878, and gradually fell from month to month until it sold at \$16½ in November of that year, which was the lowest point touched during the depression. It gradually advanced to \$17½ in January, 1879, and from that to \$20½ in December, 1879. In February, 1880, it reached the maximum, \$43, and fell to \$26 by May 1, and to \$25 by May 12.

Hanging Rock coal-blast charcoal pig-iron sold at Cincinnati at an average of \$33½ a ton in January, 1878, maintaining that price until June, when it fell to \$31, which in turn was maintained until December when \$30 was reached. From February, 1879, to July the price was only \$28, but in August it advanced to \$30, and continued steadily upward until it touched \$47 in December. In January, 1880, it reached \$55, in February and March it sold at \$60, but by May 1 it fell to \$50.

Best refined bar-iron sold at Philadelphia at \$44.80 a ton in January, 1878, falling to \$42.56 in October. In January, 1879, it sold at \$40.32, from which it steadily advanced until it sold at \$72.24 in December. In January, 1880, it reached \$80.64, in February it touched \$86.12, but by May 1 it fell to \$67.20, and by May 12 to \$56.

Cut nails sold at Pittsburgh and Wheeling at \$2.50 a keg, in large lots, in January, 1878, falling to \$1.90 in October, but advancing to \$2.05 in December. In April and May, 1879, \$1.90 again became the price, but on May 23 an advance to \$2 was made. Several attempts were made by Western manufacturers to advance prices in June and July, but they were kept down by Wheeling manufacturers until July 18, when prices were advanced to \$2.25. In December they reached \$4.15. In February, 1880, they touched \$5.15, or \$5.25 to buyers of small lots, but by May 12 the price fell to \$3.25.

The lowest point which iron rails touched at Philadelphia during the depression was \$32½ a ton in October, 1877. In January, 1878, they sold at \$33½ and in December at \$34, advancing steadily in 1879 from \$34 in January to \$54 in December. In February, 1880, they touched \$68, but by May 1 they fell to \$53, and by May 12 to \$50.

Steel rails sold at \$40½ a ton at the works in Pennsylvania in November and December, 1877, advancing to \$43½ in May and July, 1878, falling to \$41 in December, and advancing in 1879 from \$41 in January to \$67 in December. In February, 1880, they touched \$85, but by May 1 they were sold at \$70, and by May 12 at \$65.

Old iron rails sold at Philadelphia at \$20 a ton in January, 1878, falling to \$18½ in June, July and August, but rallying to \$19½ by December. In January, 1879, they sold at \$30½, advancing by December to \$34. In February, 1880, they sold at \$43, but by May 1 they fell to \$30, and by May 12 to \$26.

No. 1 wrought scrap was sold at Philadelphia at \$23 a ton in January, 1878, but from July to December it was sold at \$20. In January, 1879, it was still sold at \$20, but the price steadily improved throughout the year until it reached \$33 in December. In February, 1880, it was sold at \$41, but by May 1 the price fell to \$30, and by May 12 to \$28.—*Bulletin of the American Iron and Steel Association, May 12.*

#### Show Your Ticket.

A corpulent old lady was at the London Bridge station, going down into Sussex; she had a big bag and a small one, and was bustling through the gate to reach the train, when the ticket collector called out, "Ticket, ma'am! Can't pass here till I see your ticket." "I ain't time," she replied. "Can't pass—can't pass." "I will pass." "Can't ma'am. The rules are very strict." "You will make me miss the train," she shouted, "Plenty of time, ma'am; train does not go for fifteen minutes yet." She backed out, put down her bags, and, after a long hunt, she found the key and opened the big one. Article after article was taken out and laid aside, but she could not find the ticket. The smaller one was submitted to the same treatment, the old lady all the while growling to herself; and when ten minutes had slipped away she looked up and inquired "What ticket do you want?"



"Your railway ticket, of course," he replied. "Why, I had that in my hand all the time, you impudent fellow," she exclaimed, as she hustled the things into the bags. "Then why didn't you show it, ma'am?" "Then why didn't you say railway ticket, sir? You want to understand that there are a hundred different kinds of tickets, sir; and if you ever stop me again, I'll go to the head man of the railway at once."

#### OLD AND NEW ROADS.

**Atlantic & Pacific.**—This road is now definitely located for 53 miles westward from Albuquerque, N. M., and the first section of 25 miles is graded. The rails are now on the way to Albuquerque.

**Baltimore & Ohio.**—At meetings held in Columbus, O., May 19, the Central Ohio and the Sandusky, Mansfield & Newark companies ratified new leases of their roads to this company. Both leases are to run until 1926. Both the roads have long been leased to this company.

**Bradford, DeGoliis & Smethport.**—This lately organized company has been consolidated with the Bradford, Bordell & Kinzua, which is building a road on very nearly the line proposed by the new company.

**Brighton Beach & New York.**—This company has been organized to build a short road from Brighton Beach on Coney Island to the new race-course in the town of Gravesend. The capital stock is fixed at \$150,000.

**Burlington & Missouri River in Nebraska.**—The stockholders have ratified the agreement for the consolidation of this company with the Chicago, Burlington & Quincy.

**California Railroad Commission.**—The board has passed a resolution requiring all railroad companies in the state to furnish copies of the schedules of fares and freight rates in force on Dec. 31, 1879, and on May 1, 1880.

The times for the hearings on transportation questions at points in Southern California have been fixed as follows: Colton, May 24; San Gabriel, May 26; Los Angeles, May 28; Wilmington, May 31; Anaheim, June 2; Santa Monica, June 3.

**Chicago & Paducah.**—The United States Circuit Court has confirmed the sale of this road under foreclosure, which was made on April 6. The Purchasing Committee, which bought it in the interest of the Wabash, St. Louis & Pacific Company, has made the cash payments required by the terms of sale.

**Chicago, Milwaukee & St. Paul.**—Contracts have been let for the first section of 18 miles of the extension of the Southern Minnesota Division toward the Black Hills.

A contract for building the extension of the Chicago & Pacific Division from Byron, Ill., to Lanark, 29 miles, has been let to Hoblitzell, Platt & Co., of Ursino, Pa., who are to begin work at once.

It is stated that this company has bought the Wisconsin Valley road, extending from Tomah, Wis., to Jenny, 107 miles, chiefly through a lumber country. This road was in trouble some two years ago, having too heavy a debt, but has since reduced and adjusted its debt. Its earnings this year have shown a great gain.

It is also reported that this company has leased the Chicago, Clinton, Dubuque & Minnesota, better known as the "River Road," running up the west bank of the Mississippi from Clinton, Ia., to La Crescent, Minn., 173 miles. This road has also a branch from Turkey River to Wadena, 43 miles, and its possession carries with it the control of four narrow-gauge branches running back from the river—the Chicago, Bellevue, Cascade & Western, 35 miles; the Waukon & Mississippi, 23 miles, with an extension of 44 miles to Decorah in progress, and the Caledonia, Mississippi & Western, of which 55 miles are in operation. The lease of this road would thus add 329 miles to the Chicago, Milwaukee & St. Paul's lines.

The latest reported acquisition is the Chippewa Falls & Western road from Eau Claire, Wis., to Chippewa Falls, 10 miles. This seems somewhat doubtful, as the road does not connect with any of this company's lines, but is a branch of the Chicago, St. Paul & Minneapolis.

**Chicago, Rock Island & Pacific.**—The following statements for the year ending March 31 are published in advance of the annual report:

Gross earnings.....	\$11,061,662.46
Receipts from land.....	350,000.00
Total.....	\$11,411,662.46
Working expenses.....	\$5,798,546.11
Interest and rentals.....	1,213,147.37
	7,009,693.48

Surplus for the year.....\$4,401,968.98

This surplus is about 21 per cent. on the stock. The earnings show an increase of \$1,651,829.05, or 17.5 per cent., and the expenses an increase of \$716,673.62, or 14.1 per cent., over the previous year.

A survey is being made for a new line from Davenport, Ia., to Muscatine, which will be some 10 miles shorter than the present line by Wilton Junction, and will also pass through the coal-fields about Blue Grass.

**Cincinnati Southern.**—The passenger rates over this road have been reduced to two cents per mile temporarily, the reduction to continue until July 1. It is thought that this may provoke retaliation from the Louisville & Nashville.

**Cleveland, Columbus, Cincinnati & Indianapolis.**—This company, having been requested by some bondholders to cancel the sinking fund clause contained in the consolidated mortgage, and to permit the said bonds to run until their maturity in the year 1914, notice is given that any of the holders of the consolidated bonds may present their bonds at the United States Trust Company, in New York, where an indorsement will be placed upon them, canceling the sinking fund clause, and all bonds so indorsed will hereafter be excluded from redemption prior to their actual maturity in the year 1914, but for any bonds outstanding not so presented and indorsed this company will continue to deposit the sinking fund *pro rata* with the trustees, and such bonds will remain subject to redemption by the sinking fund as in the original deed of trust provided.

**Concord.**—The reported sale of a controlling interest to the Old Colony Company is denied by authority.

**Connott Valley.**—This road was formally opened through to Canton, O., May 15, track on the extension having been laid several weeks ago. It is now in full operation from Canton, O., to Dell Roy, 36 miles. It is of 3 feet gauge, and is chiefly a coal road.

**Fulton County.**—Track-laying is now in progress on this road between Cuba, Ill., and Lewistown, and the grading is done between Lewistown and Havana. Surveys have been

made from Cuba by Fairview to London Mills, and some money raised on the line.

**Galveston, Harrisburg & San Antonio.**—The trustees under the first mortgage, J. F. Barrett and Andrew Pierce, will receive at their office, No. 58 Sears Building, Boston, until July 1, proposals for the sale to them of bonds to the amount of \$43,000 for the sinking fund.

**Housatonic.**—The Hartford (Conn.) *Courant* of May 14 says: "A case of great interest and importance came up in the Supreme Court, Wednesday. The Housatonic Railroad, as is well known, has virtually absorbed two railroads in Massachusetts, one of which connects with it, the other being a branch of the main road. The instruments of conveyance from the two Massachusetts railroads, though in the form of leases, in fact pass all their interests in the roads to the Housatonic Company, and the latter company has expended over half a million dollars in repairing them, exercising over them all powers of supervision and control. The clause of the statute on which the counsel for the state relies assumes for a basis of taxation the sum of the market value of the stock and of the funded and floating debt, deducting the cash on hand and taxes paid for real estate not used for railroad purposes. The statute on which the defendant relies as nullifying the force of the other provides that when only a part of a railroad lies in this state, 'the company owning such road shall pay a tax of 1 per cent. on such proportion of the above-named valuation, as the length of the roads lying in this state bears to the entire length of the road.'"

"The counsel for the company in a long and elaborate argument claimed that the instruments of conveyance referred to above, transferred the ownership of these two companies to the Housatonic railroad company; that though they were styled leases, yet that Court for the purpose of carrying out the intention of the parties will regard them as absolute conveyances, that the companies had power to enter into such contracts under the statutes of Massachusetts. The counsel for the state claimed that however the question might be as between natural persons, corporations who are now creatures of the law had no power to make such conveyances, and urged the impolicy of withdrawing such a large amount of property from the sphere of taxation."

**Illinois Central.**—The new tracks from Chicago to Kensington, to be used for suburban traffic, were opened by an excursion on May 14, to which about 200 gentlemen were invited. One of the new trains built expressly for this suburban traffic was used; it consisted of a double-ended engine built by the Rogers Works, in Paterson, and five light cars, made very much on the model of those in use on the elevated roads in New York.

**International & Great Northern.**—Notice is given that the securities of the New York & Texas Land Company are now ready to exchange for Purchasing Committee's receipts for Houston & Great Northern and International second-mortgage and convertible bonds. The new securities will be delivered on presentation of the receipts at the office of J. S. Kennedy & Co., No. 63 William street, New York.

**Keyser & Pendleton.**—This company has been organized to build a railroad from the Baltimore & Ohio, at Keyser, up the South Branch Valley to Romney and Moorefield, and at some future time, to Pendleton County, W. Va. It will pass through some country very rich in iron ore.

**Leadville, Roaring Fork & Gunnison.**—This company has been organized to build a narrow-gauge road from Leadville by Roaring Fork to the Gunnison mining region.

**Lehigh Valley.**—The Pennsylvania Supreme Court has decided in this company's favor in its suit for abatement of tax assessed on its stock. The tax assessed against the company was about \$66,000, and the amount paid \$54,000. The price for which the stock sold during the year was from \$38 to \$50. The company appraised it for taxation at \$42, and the Auditor-General rejected the appraisal and made valuation based on the average quotation of the Philadelphia Stock Exchange during the first fifteen days in November, equal to \$51 a share. The Court holds that the average value of the stock during the year is the proper basis of taxation.

**Little Rock, Mississippi River & Texas.**—This company has arranged with the St. Louis, Iron Mountain & Southern road for the entry into Little Rock of its extension from Pine Bluff, Ark., to that city. The track from the depot to the river front will be owned and used jointly.

**Manchester & Ashburnham.**—An effort is being made to revive this project, and a new survey is being made of the proposed line from Manchester, N. H., to Fitchburg, Mass. The company is said to have secured promises of substantial aid from several of the large manufacturing corporations in and about Manchester.

**McComb & Deshler.**—Ground has been broken for this road, which is to extend from McComb, O., to Deshler, about 12 miles.

**Metropolitan Elevated.**—This company has decided to issue \$4,000,000 second-mortgage bonds in order to complete its lines and provide additional terminal facilities. There is a first-mortgage for \$8,500,000 and an attempt was made recently to place \$2,500,000 debenture bonds, but that kind of security did not meet with favor, and the issue was withdrawn. It is not expected that more than \$2,500,000 of the new bonds will be sold at present. The proposed issue has been approved by the stockholders; also by the New York Elevated and Manhattan companies, as required by the lease.

**Minneapolis & Northwestern.**—St. Paul dispatches state that this company has concluded arrangements by which the St. Paul, Minneapolis & Manitoba Company will build the projected road from Minneapolis, Minn., to St. Cloud, the line running for the most part about midway between that company's two lines.

The agreement provides that 10 miles of the road at least shall be finished this year; 40 miles more in 1881, and the remaining 50 miles by Jan. 1, 1884. The agreement also provides for the building of a new union depot in Minneapolis. This agreement disposes of the Northwestern road as a narrow-gauge competing line, which was the original project.

**Minneapolis Transfer Co.**—At a meeting held in Minneapolis, May 15, at which all the lines entering that city were represented, it was decided to organize a transfer company, to control and manage all the connecting tracks and switches, in fact, all the railroad tracks in Minneapolis except the through track of the St. Paul, Minneapolis & Manitoba. The company will do all the switching and make all the transfers, and will build all necessary switches and spurs hereafter.

**New Jersey Midland.**—The order of the Chancellor for the transfer of this road was made last week, and the Receivers formally delivered possession of the property to the Midland Railroad Company of New Jersey at midnight of May 15. The new company assumes all the current liabilities for wages, supply bills and similar matters.

**New York & New England.**—The following is dated May 10:

"The New York & New England Railroad Company, as lessee, will assume control of the Connecticut Central Railroad and its leased line on the first of June, proximo, and thereafter the jurisdiction of the general officers of this company will extend over that property, which will be operated as a part of the Western Division, under J. T. McManus, Superintendent. Heads of departments will give proper instructions to secure uniformity of administration and accountability."

The Connecticut Central road extends from East Hartford to Longmeadow, 22 miles, and is extended thence 7 miles to Springfield by the leased Springfield & New London road. It has also a branch from Melrose to Rockville, 7 miles.

At a special meeting in Boston, May 18, the stockholders voted to accept the act of the Massachusetts Legislature authorizing the sale to the company of the 25-acre lot on the South Boston flats for \$1,000,000, and the 12-acre tract for \$108,135; also authorizing the company to take \$500,000 stock in steamboat lines. Vice-President Wilson made a statement showing an increase of \$159,655 in the net earnings for the seven months of the current fiscal year.

**New York City & Northern.**—The stockholders of this company have voted to authorize a consolidated mortgage for \$4,000,000, the bonds to bear 6 per cent. interest. Of these \$3,427,380 will be exchanged for the \$1,800,000 outstanding 7 per cent. bonds of the company, and the \$1,000,000 bonds of the leased West Side & Yonkers road. They also voted to increase the stock from \$2,250,000 to \$3,000,000; of the additional stock \$400,000 will be exchanged for West Side & Yonkers stock, and the remaining \$350,000, with the \$572,620 unissued bonds, will be retained to provide for construction.

**New York, Ontario & Western.**—The time within which the stockholders of the New York & Oswego Midland Railroad Company could avail themselves of the statute which provides for the redemption from the successor company of railroad property sold under foreclosure proceedings expired May 14. No effort to redeem the property was made, and the successor company is therefore at liberty to carry out its plans and consummate its contracts for the improvement and extension of the road. It is understood that the assessments provided for by the plan of reorganization have supplied a fund of over \$7,000,000 for these purposes. Work which had been in progress on the Ithaca, Auburn & Western (formerly the Western Extension of this road) has been stopped, the reason given being that this company has redeemed or bought back the road.

This company has bought the Jersey City & Albany road, from Ridgely Park, N. J., to Haverstraw, N. Y. What use is to be made of it is not very clear as yet.

**New York, Pennsylvania & Ohio.**—A meeting was held in New York last week for the purpose of settling and renewing contracts for exchange of traffic with the New York, Lake Erie & Western and the Pennsylvania Company. It is understood that no new agreements were made, but the old ones were simply renewed, they having been closed by the foreclosure sale and the transfer to the new company.

**Oregon Railway & Navigation Co.**—This company will extend its Walla Walla & Columbia River road from Wallula down the river to Grand Ronde Landing, this extension enabling the boats of the company to avoid the dangerous Umatilla Rapids in the Columbia. When the road which the company is building from Celilo eastward reaches Grand Ronde Landing, it is understood that the line from that point to Walla Walla will be changed from narrow to standard gauge.

**Osage Valley & Southern Kansas.**—This road is now completed from the Missouri Pacific at Tipton, Mo., southward to Versailles, about 18 miles. It has been built by Col. R. L. Stephens, of Booneville, Mo., and will be worked by the Missouri Pacific as a branch.

**Portland & Ogdensburg, Vermont Division.**—A survey is to be made for an extension of this road from Scranton, Vt., to a connection with the Ogdensburg & Lake Champlain road at Rouse's Point, N. Y., a distance of about 11 miles. It is said that connecting roads will advance the money needed to build the road.

**Portsmouth & Dover.**—At a special meeting in Portsmouth, N. H., May 12, the stockholders voted to reduce the capital stock to \$769,000, in accordance with the decision of the referee; also to sell 112 additional shares of stock to pay the amount found due to the Eastern Company by the referee.

**Quincy, Missouri & Pacific.**—Track on this road is now laid to a point 10 miles westward from the late terminus at Greencastle, Mo., and 100 miles from West Quincy. Further advance will be delayed for a short time by a deep cutting which is still unfinished. About five miles remain to reach Milan, and it is understood that when the track is laid to that place the road will be transferred to the Wabash, St. Louis & Pacific Company.

**Richmond & Southwestern.**—This company purposes building a narrow-gauge road from a point on York River to Richmond, Va., and thence by way of Lynchburg through Southwestern Virginia and Kentucky to the Ohio River at Paducah, with branches to Maysville, Cincinnati and Louisville. The company claims to have a large amount of stock already subscribed for, and is now canvassing for local aid in the various counties along the line in Virginia and Kentucky.

**St. Louis, Alton & Terre Haute.**—Notice is given that, in pursuance of the order of the Court, the coupons due Nov. 1, 1878, on the second-mortgage income bonds will be paid on presentation at the company's office in New York.

**St. Louis & San Francisco.**—The track of the Kansas Division is now laid to Augusta, Kan., 25 miles beyond the late terminus at Beaumont, 197 miles from the main line at Peirce City, and 487 miles from St. Louis. There are still 21 miles of track to be laid to reach Wichita, but the company hopes to have this done early in June.

**St. Paul, Minneapolis & Manitoba.**—In the case of Sahlgard against Kennedy and others, a suit brought to set aside the foreclosure and sale of the St. Paul & Pacific road and its transfer to this company, the United States Circuit Court at St. Paul has overruled a demurrer filed, and decided that defendants must put in an answer to the bill so that the case may be determined on the proofs.

In the similar case of Koopholder against Kennedy and others, a demurrer is sustained and the complaint dismissed, on the ground that no sufficient evidence is given in support of the allegations made.

**Savannah, Florida & Western.**—The hearing in the suit to restrain the Georgia Railroad Commission from interfering with rates or other matters in the management of this road, has been postponed to June 15, at Atlanta.

**Selma, Rome & Dalton.**—A meeting of holders of Alabama & Tennessee River bonds was held in New York,



engines and 100 box-cars are needed and have been contracted for this year.